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PROSPECTS FOR THE CONTROL OF VIRAL DISEASES BY CHEMICAL AGENTS*

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THE remarkable advances made during recent years in the chemotherapy of bacterial infections have not been paralleled by similar advances in the treatment of viral diseases. In fact, relatively little concerning specific therapy of viral infections is known. There is sufficient knowledge of the metabolic processes of bacteria as well as the mechanism by which viruses multiply to afford a basis for an explanation of this very striking difference.

Bacteria, as all know, are free-living organisms which carry out metabolic processes no less complex than those of much higher organisms. Because of this the metabolism of bacteria is vulnerable to attack at many points. Present evidence indicates that the effectiveness of chemotherapeutic agents in bacterial infections is dependent upon their capacity to block metabolic steps which are essential to the growth of bacteria; they produce a selective nutritional deficiency of the micro-organism. Viruses, however, are certainly not free-living organisms, and perhaps should not be thought of as similar to living agents. It is well established that the multiplication of viruses is strictly dependent upon the presence of living cells. So far as is known viruses do not carry out intrinsic metabolic processes; indeed, they do not even possess energy transfer systems. Because of this it is understandable that they are relatively invulnerable to the effects of chemotherapeutic agents and are inaccessible to attack except insofar as their multiplication can be affected by altering the metabolic environment of host cells.

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For our present problem it seems desirable to survey available knowledge regarding viruses and to search carefully for possible vulnerable points which might be susceptible to attack by chemical agents. One of the most striking properties of viruses is their extremely small size. It was their filterability, which depends upon the difference in size between viruses and other infectious agents, which first served to distinguish this group of agents. It is known now that different viruses vary enormously in size.¹ Some of the smallest are only slightly larger than some protein molecules and indeed actually are smaller than the haemocyanins of certain snails. Others, the largest, are only slightly smaller than some bacteria and in fact are somewhat larger than pleuro-pneumonia organisms. The enormous range of sizes suggests that they are an extremely heterogeneous group and it is known that viruses differ among themselves as regards a number of important characteristics. We shall return to this point later.

Chemical studies on highly purified viral preparations have revealed that these agents are composed chiefly of nucleoprotein but, in addition, may contain other constituents including carbohydrates, fats, etc.¹ Parenthetically it should be pointed out that we are not here concerned with plant viruses which, in some instances, are known to be nucleoproteins obtainable in crystalline form. Despite the complexity of the chemical structure of the larger viruses, it can be shown that the smallest viruses do not possess a sufficient cubic volume to permit the inclusion of all of the components which are essential for the reproduction of bacteria and other living cells.

The most distinctive property possessed in common by viruses is their capacity to induce infection in susceptible hosts. The altered physiology of cells infected by viruses results in the development of those abnormalities which we term viral diseases. Infection is constantly associated with multiplication of the infecting agent; the virus increases in concentration within

cells. Most workers think that viruses are discrete particles; a great many viruses have been visualized, the larger with an ordinary light microscope, the smaller, even the smallest, with the electron microscope. Multiplication of a virus in an infected cell is accompanied by a striking increase in the number of viral particles present.

The one property which distinguishes viruses from almost all other infectious agents is their strict dependence upon the presence of living cells for multiplication; no virus has been shown to multiply in a cell-free medium. Not only must living cells be present but, in many instances, the selectivity and specificity of these agents is so great that they can only infect one particular kind of cell in a single animal species. In many respects such specificity is reminiscent of that manifested by certain enzymes. The number of virus particles which develop within a single cell has been determined in a few instances and is of the order of 100.² Inasmuch as infected tissues commonly contain as many as one billion virus particles per gram, it can be computed that each gram of such tissue contains about 10 million susceptible cells.

The exact mechanism by which viruses multiply in living cells is unknown. Unquestionably this is the most important problem in the virus field. Present evidence indicates that viruses multiply within cells, usually within the cytoplasm, occasionally perhaps within the nucleus, and it is thought that multiplication is mediated by a perversion of the normal metabolic processes of the host cell which become oriented in the direction of fostering viral synthesis. This may result in stimulation of the cell, in which case hyperplasia follows. More commonly the abnormal metabolism leads to death of the cell and necrosis follows. Inflammatory reactions are but secondary phenomena which follow cellular alteration associated with viral multiplication.³

Sufficient work has been done on the mechanism of viral infections, particularly with bacteriophage but also with influenza viruses, to make it possible to develop a hypothetical scheme which appears to fit the available facts. Such a scheme is shown in Table I. Five distinct and separable steps can be recognized during the course of infection of a single susceptible cell with one virus particle. The first step in the process is the establishment of contact or com-

bination between the virus particle and the susceptible host cell. It seems obvious that in the absence of virus-cell union infections cannot

TABLE I.
STEPWISE SCHEMA OF A VIRAL INFECTION

No.	Step
1.	Virus particle $\xrightarrow{\text{cofactor}}$ Cell = Virus-cell union.
2.	Step 1. $\xrightarrow{\text{time}}$ Cell surface alteration.
3.	Step 2. $\xrightarrow{\text{time}}$ Viral penetration.
4.	Step 3. + Cell Metabolism $\xrightarrow{\text{time}}$ Viral multiplication.
5.	Step 4. $\xrightarrow{\text{time}}$ Release of n Virus particles.
	n Virus particles $\xrightarrow{\text{cofactor}}$ n Cells = n Virus-cell unions.

occur. With bacteriophage Anderson⁴ recently made the astounding discovery that the presence of a cofactor is essential if virus-cell union is to be consummated. With two strains of phage this substance is known to be tryptophane.

The second step, which involves alteration of the host cell surface by viral action, may not be essential even though there is good evidence that it occurs. The strongest support for this step has been obtained with viruses which cause agglutination of red blood cells *in vitro*.⁵ Such agents cause a definite alteration in the surface of susceptible cells but whether this is a necessary event before other steps in the process can follow is not yet certain.

The third step is the penetration of the host cell or its limiting membrane by the virus particle. It appears illogical to think that a virus could obtain the energy and the substances necessary for the synthesis of other particles identical with itself unless it achieved intimate association with intracellular metabolic processes. In order for this to occur it seems essential that the virus particle should penetrate into the cell.

The fourth step is that which results in multiplication of the virus; in the formation of new virus substance; in an increase in the number of virus particles. As has been indicated, all available evidence points to the probability that the virus steals from the metabolic processes of the host cell both the substance and the energy necessary to accomplish this result.

The fifth step, the release of newly formed virus particles from the infected cell, is on very solid ground. It has been pointed out already that the number of virus particles which are released from an infected cell is approximately 100. The whole complex process now repeats itself. The virus particles released from an infected cell establish contact with a number of susceptible host cells and thus a geometric progression is initiated which results eventually in the development of disease. Theoretically then, a single virus particle can start a chain reaction which, under perfectly ideal conditions, will leap forward geometrically in cycles each of which is 100-fold larger than that preceding it. Surprisingly close approximation of the theory has been obtained experimentally with three different viruses; vaccinia, phage and influenza.

The factor of time indicated in steps 2 through 5 is of importance and influences both the incubation period and the interval required for maximum viral multiplication. In the case of phage each of the time intervals is measured in minutes and the total time required from step 1 to the conclusion of step 5 is no more than 10 to 20 minutes.² In the case of influenza virus there is evidence indicating that the total time required for the 5-step cycle is of the order of 8 to 12 hours.⁶ With some other viruses, for example, mumps, there is good reason to think that the cycle time is considerably longer.

Partly because of limitations of methodology steps 1 and 5, respectively, are those which have been studied most. Either step can be investigated without great difficulty and the degree of experimental precision attainable is fairly high. However, relative to the control of viral diseases, it seems probable that steps 1 and 4, but not 5, are those which are most amenable to alteration by chemical agents.

Let us now survey the various possibilities which in theory could provide means by which viral diseases might be controlled. At the outset it seems important to distinguish sharply between prophylactic and therapeutic procedures even though it is not possible in all instances to draw a sharp line which clearly separates them. For our present purpose it will be unnecessary to dwell upon chemical agents which cause inactivation of the virus itself. There appears to be no reason to think that disinfect-

ants are liable to prove of value in the control of viral diseases. In Table II an attempt has been made to present in very brief form each of the possibilities for which there is any experimental evidence. Inspection of the series shows

TABLE II.
THEORETICAL POSSIBILITIES FOR CONTROL OF
VIRAL DISEASES

Procedure	Experi- mental example	Probable mechanism	
		Prevention of cell- virus union (step 1)	Inhibition of viral multipli- cation (step 4)
<i>Prophylactic (before infection)</i>			
Specific immunization	Yellow fever	+	
Artificial cell alteration	Influenza	+	
Adsorption cofactor analogue	Phage	+	
Viral interference	Influenza		+
Nutritional deficiency	PVM		+
<i>Therapeutic (after infection)</i>			
Cell metabolite blockade	Mumps		+
Viral interference	Influenza		+
Nutritional deficiency	PVM		+

that all of the procedures are concerned with the induction of alterations in the host, not in the infecting virus. In this connection it may be of value to point out again that, whereas modern antibacterial chemotherapy is directed against the microbial agent itself, it seems exceedingly improbable that viral diseases can be controlled by means of magic bullets directed against viruses themselves.

Prophylactic or preventive procedures are those which are employed before infection has been initiated. Specific immunization is an example and an important one which has already proved to be of great value in the prevention of both smallpox and yellow fever. Artificial alteration of the surface of susceptible cells by chemical or enzymatic action is a possible means of achieving prophylaxis and has been shown to be effective in a limited way and for a short period of time in animals with influenza virus.⁷ It is conceivable that a chemical analogue of the cofactor required for the adsorption of a virus by a susceptible cell could block adsorption. In the case of phage Delbrück⁸ has shown recently that this can be accomplished; indole blocks adsorption of a phage which requires tryptophane as a cofactor. The use of a different virus to

induce that peculiar phenomenon termed viral interference could be invoked as a possible means of preventing viral infection and with influenza, as well as with a number of other viruses, this has been shown to be effective in animals although only for a very few days.⁹ Recently the possible prophylactic effects of various nutritional deficiencies have received increasing attention and with pneumonia virus of mice, termed PVM, it has been shown that in animals pyridoxine deficiency has slight prophylactic efficacy.¹⁰ At the present time these five procedures appear to be the only ones which give any indication of prophylactic application.

Therapeutic procedures, those which are employed after infection has been initiated, are perhaps more likely to be useful in attempts to control viral diseases as they are now important in the control of bacterial infections. There appear to be but three possibilities. The first is the production of a blockade of some metabolic system of the host cell which is essential for the multiplication of a virus. There is already some indication with mumps,¹¹ as too with PVM,¹² that this can be accomplished in experimental animals with the result that the infection is modified. The induction of the viral interference phenomenon by the injection of a different virus is a theoretical therapeutic possibility but probably is not of more than academic interest. Various nutritional deficiencies might be invoked as feasible therapeutic procedures and it has been shown recently that under experimental conditions with PVM a slightly beneficial effect can be obtained in animals.¹⁰

If one now analyzes the probable mechanism by which each of the procedures enumerated might operate, it becomes apparent that the first three prophylactic procedures obtain their effects because they prevent combination between the virus and the susceptible cell; prevent virus-cell union. In other words, they block step 1 in the scheme presented in Table I. All the other procedures, however, including each of those which seems to offer some merit as a therapeutic possibility, obtain their effects because they inhibit viral multiplication within the host cell and do so, it appears, by blocking step 4 in the scheme shown in Table I.

Among this series of eight procedures it seems highly probable that only two merit serious con-

sideration as techniques which might be applicable to viral diseases in man. It is hardly necessary to emphasize the established effectiveness of specific immunization as a prophylactic procedure in such conditions. Unfortunately, satisfactory techniques have been developed for specific immunization against only a very few viral infections. It is known that at least 40 different infectious diseases of human beings are caused by viruses. It seems unlikely that it will be possible to immunize effectively large segments of a population against many viral diseases in the foreseeable future.

The only therapeutic procedure which appears to offer some promise is that concerned with the chemical blockade of cell metabolites. It will be apparent to those who are familiar with recent work on the mechanism of action of bacterial chemotherapeutic agents that there is an analogy between this procedure and the effects of antibacterial agents, but it should be emphasized again that with viruses the effect is one step removed and is directed against the host cell and not the infectious agent.¹²

It is pertinent now to survey briefly the results which have been obtained with certain chemical agents in diseases caused by various infectious agents. It will be apparent from the

TABLE III.
EFFECT OF CHEMICAL AGENTS ON VARIOUS INFECTIONS.
CONDENSED SUMMARY

Infection induced by		Chemical agent		
Agent	Example	Sulfonamide	Penicillin	Chloromycetin
Bacteria				
Gram +	Pneumonia	4*	4	4
Gram -	Typhoid	±	±	4
Rickettsiae	Typhus	0	0	4
Viruses				
large	Psittacosis	4	4	4
medium	Variola	0	0	0
small	Influenza	0	0	0

*4 = degree of effectiveness.

condensed summary shown in Table III that the size and the complexity of infectious agents provide no indication as to the nature of the chemical agents which may be effective in combating infections induced by them. Although the sulfonamides and penicillin are almost entirely ineffective against most Gram-negative bacteria and all rickettsiae, they are of definite usefulness in infections caused by the largest of viral agents, the so-called psittacosis-lympho-

granuloma venereum group. Chloromycetin, however, a more recently discovered chemotherapeutic agent, seems to be effective not only in infections induced by Gram-positive and Gram-negative bacteria, but also in those caused by rickettsiae as well as in infections due to the largest viruses.¹³ It should be emphasized that infections induced by any of the medium and small size viruses are totally unaffected by any of these chemical agents.

On the basis of chemotherapeutic experiments it would appear appropriate to place the psittacosis-lymphogranuloma group of viruses above rickettsiae and perhaps even between Gram-positive and Gram-negative bacteria. There are now a number of reasons for excluding this group of agents from consideration with other agents which may properly be called "true" viruses. This concept recently has been given official taxonomic sanction¹⁴ and the psittacosis-lymphogranuloma group is now referred to as the family Chlamydozoaceae, in the order Rickettsiales. What we might term the "true" viruses are classed together in the order Virales.

With but three possible exceptions, chemical agents have not been shown to exert a beneficial effect upon viral infections in man. The exceptions are lymphogranuloma venereum, trachoma and inclusion blennorrhoea, each of which appears to be favourably influenced by the sulfonamides and somewhat less so by penicillin. There is a difficulty here, as has been indicated, because it is probable that the agents which induce these diseases should not be considered as true viruses but should be classed with the rickettsiae, a higher order of infectious agent. It seems possible that chemical agents active against viral infections may be found; indeed, there are already some indications of the means by which this objective may be attained.

It is well known that a very large number of substances have been tested for chemotherapeutic activity in numerous viral infections and that almost uniformly such tests have yielded negative results. At least 20 different viruses have been employed in experiments with sulfonamides, penicillin or streptomycin. With the exceptions noted above, no evidence has been obtained that antibacterial chemotherapeutic agents are effective against viral infections. Indeed, at the present time it is common practice in laboratories to employ sulfonamides,

penicillin or streptomycin, either separately or together, in order to rid viral suspensions of contaminating bacteria. In numerous instances such procedures greatly facilitate the recovery of viruses and, with the exceptions already noted, do not inhibit viral multiplication in the least.

Not only are antibacterial chemotherapeutic substances totally ineffective against all except the very largest of viral agents, but also a great many other substances have been shown not to possess chemotherapeutic properties in viral infections. Andrewes, King and van den Ende¹⁵ employed 115 different compounds in experiments with influenza A virus and 74 in experiments with vaccinia virus and found none to be active. Other workers have added greatly to the long list of ineffective compounds and no fewer than 4,000 different substances have been tested.

Recently, however, evidence has been obtained that the multiplication of a few medium or small size viruses can be inhibited by the injection of various complex carbohydrates. Certain bacterial and other polysaccharides cause inhibition of multiplication of pneumonia virus of mice, or PVM, in the mouse lung.¹² Apple pectin has been shown to inhibit the multiplication of influenza A virus in the chick embryo.¹⁶ Moreover, mumps virus multiplication in the chick embryo is inhibited by Friedländer bacillus capsular polysaccharide.¹⁷ It should be mentioned that numerous studies have been made with bacteriophage strains and present evidence indicates that bacterial polysaccharides,¹⁸ acridine compounds,¹⁹ 5-methyl tryptophane²⁰ and indole⁸ possess some inhibitory activity.

Infection induced with PVM in the mouse results in the development of extensive pneumonia; if sufficient virus is inoculated intranasally, the disease consistently causes death.²¹ A number of polysaccharides of bacterial origin, as well as some derived from other sources, are effective in modifying the course of the infection; they arrest the progress of pneumonia and prevent death of the animal.¹² Because these substances produce such effects when given some days after infection has been initiated, it appears appropriate to consider that they possess chemotherapeutic properties against this viral infection. Capsular polysaccharides obtained from Friedländer bacilli are as active as any other carbohydrates so far tested. It is of interest that these same poly-

saccharides are also active with respect to mumps virus inhibition in the chick embryo but are entirely inactive relative to influenza A, influenza B and Newcastle disease viruses in either the mouse or the chick embryo.¹¹ Apple pectin appears to be more active than other polysaccharides against influenza A virus in the chick embryo but is entirely inactive against mumps virus in the chick embryo as well as against PVM in the mouse.

With PVM as little as 1.6 micrograms of Friedländer polysaccharide per mouse causes significant inhibition of virus multiplication,¹² as is shown in Fig. 1. With mumps virus 5 megm. of polysaccharide per chick embryo effectively inhibits virus multiplication,¹¹ as is shown in Fig. 2. The degree of viral inhibition obtained is directly related, although not strictly proportional, to the quantity of polysaccharide injected. With either virus inhibition, corresponding to approximately a 100-fold reduction in maximal titre, is obtained following the injection of 0.1 mgm. of poly-

saccharide. In the case of influenza A virus 25 to 50 mgm. of apple pectin per chick embryo is required to inhibit multiplication.¹⁶

In infections induced either by PVM or mumps virus a single injection of polysaccharide may be given as late as 4 days after inoculation and will still cause demonstrable inhibition of virus multiplication^{11, 12} as can be seen from the results presented in Figs. 3 and 4. It is important to point out that both viruses multiply relatively slowly; neither agent reaches a maximal titre in susceptible hosts until 6 or 7 days after the inoculation of 1,000 infectious doses. Polysaccharide remains fixed in the mouse lung for surprisingly long periods after intranasal injection and even when it is given as long as 7 days before inoculation with PVM definite protective effects are demonstrable.¹² With influenza A virus inhibition is obtained when apple pectin is injected one hour after inoculation.¹⁶ Relatively large viral inocula, for example from 1,000 to 10,000 infectious doses, can be

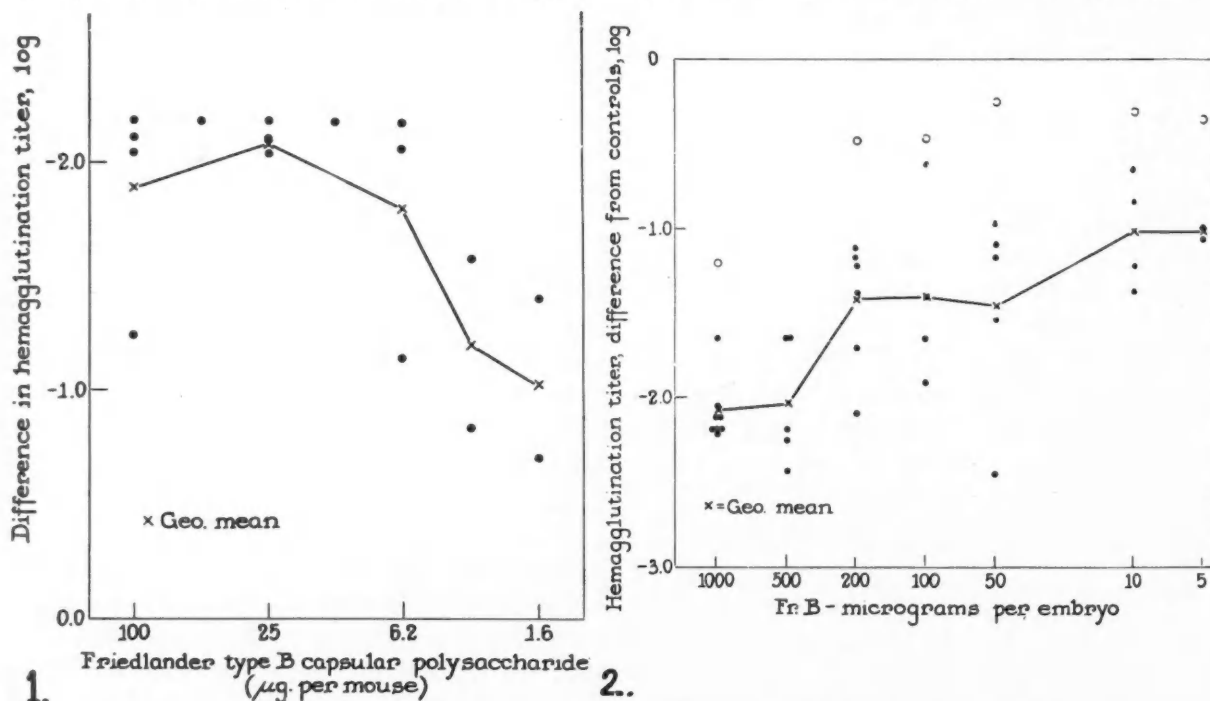


Fig. 1.—Effect of intranasal instillation of different quantities of Friedländer polysaccharide on hæmagglutination titre of suspensions of mouse lungs infected with PVM. The polysaccharide preparation was given 2 days before the virus. Each end point was determined by the results obtained in a group of at least 6 mice. From data reported by Horsfall and McCarty.¹² Reprinted with the permission of *The Journal of Experimental Medicine*. Fig. 2.—Effect of different quantities of capsular polysaccharide of Friedländer bacillus type B (Fr. B) on the hæmagglutination titre of allantoic fluids obtained from chick embryos inoculated with 100 E.I.D. of mumps virus. Polysaccharide was injected intra-allantoically 3 hours after virus. Groups of 4 embryos were employed; each end point represents the mean difference in titre between one experimental and two control groups. Results indicated by open circles were obtained in a single experiment and, because they deviate systematically from the other results, they were not included in the calculation of geometric mean. From data reported by Ginsberg, Goebel and Horsfall.¹¹ Reprinted with the permission of *The Journal of Experimental Medicine*.

employed without overcoming the inhibitory effect of polysaccharides. However, if the quantity of virus inoculated is very large, for example more than 100,000 infectious doses, inhibition of multiplication by means of polysaccharide is not obtained.¹¹

In the case of PVM the polysaccharide is effective only if given intranasally; no inhibitory activity is demonstrable when large amounts of polysaccharide are given by any other route.¹² It may be pertinent to point out that the virus itself entirely fails to induce

The degree of viral inhibition obtained is inversely related to the time between inoculation of virus and injection of active polysaccharide; the longer the interval after inoculation, the less marked is inhibition of multiplication,¹¹ as is shown in Fig. 4. If polysaccharide is not given until maximal virus multiplication has occurred, that is 6 or 7 days after inoculation with either PVM or mumps virus, no evidence of inhibition is obtained.^{11, 12} Under these circumstances virus titre is not diminished and pathological lesions which are

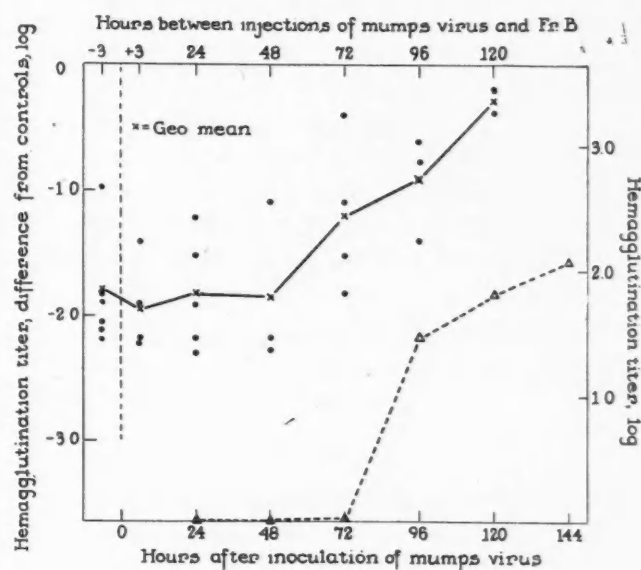
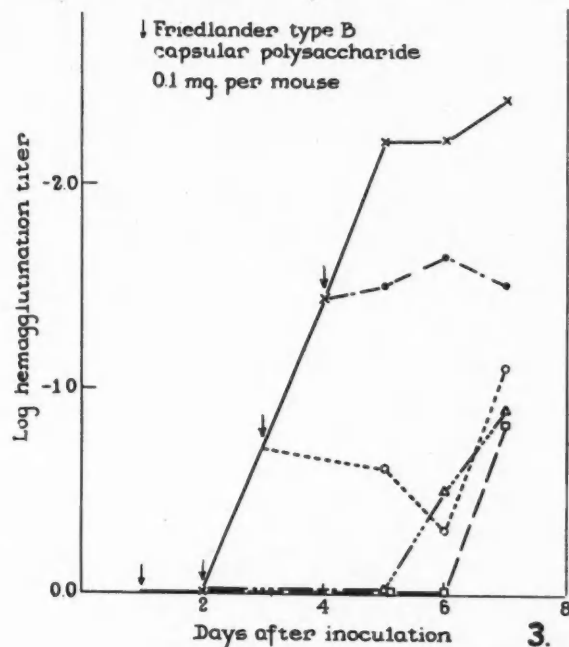


Fig. 3.—Effect of intranasal instillation of Friedländer polysaccharide on hæmagglutination titre of suspensions of mouse lungs infected with PVM. Groups of mice were given polysaccharide once only, as indicated by the arrow, at various times following inoculation with virus. Lungs were removed and tested at times indicated by the end points. Control end points were obtained simultaneously with lungs of mice which had received either saline or 0.1 mgm. of aldobionic acid at a corresponding time after inoculation with virus. Each end point was determined by the results obtained in a group of at least 6 mice. From data reported by Horsfall and McCarty.¹² Reprinted with the permission of *The Journal of Experimental Medicine*. Fig. 4.—Upper graph: The effect of time between inoculation with mumps virus and injection of Fr. B polysaccharide on the hæmagglutination titre of allantoic fluids obtained 6 days after viral infection. Groups of 4 embryos were employed; each end point represents the mean difference in titre between one experimental and two control groups. Lower graph: The rate of increase in the hæmagglutination titre of the allantoic fluid of control embryos inoculated with mumps virus. From data reported by Ginsberg, Goebel and Horsfall.¹¹ Reprinted with the permission of *The Journal of Experimental Medicine*.

infection when given by any route other than the intranasal. Apparently both the polysaccharide and the virus gain access to susceptible cells of the mouse lung from but one approach. However, it is not necessary that both reach such cells at the same time; indeed, the virus can have initiated infection and multiplied for as long as 96 hours and yet further multiplication can be inhibited by the intranasal injection of an appropriate polysaccharide.

present do not resolve at an accelerated rate. Thus, it appears that once maximal infection has developed the process is not reversed by the injection of polysaccharide. This is a serious limitation which may militate against therapeutic usefulness. In viral infections of man it is probable that maximal viral multiplication occurs some time before frank clinical symptoms are evident. Under these circumstances it would not be expected that chemical agents

which inhibit virus multiplication could cause beneficial effects when given after the onset of disease. They might, however, produce desirable results if given during the incubation period, the interval during which active multiplication of the agent occurs.

Friedländer bacillus polysaccharides withstand drastic chemical treatment without losing their capacity to inhibit viral multiplication. The available evidence indicates that the molecular configurations which endow the polysaccharide with inhibitory activity are different from those which react with homologous antibody.¹¹ The complex carbohydrates which show evidence of chemotherapeutic activity against certain viral infections are, in every instance, polysaccharides about which very little is known regarding chemical structure. This lack of information adds materially to the difficulty of obtaining a solution to the problem of the mechanism of their action.

There are now good reasons for thinking that with both PVM and mumps virus the inhibitory effects are not satisfactorily explained on the basis that polysaccharide prevents step 1, *i.e.*, prevents combination between virus and host cell. Active polysaccharide in large amount does not prevent union between PVM and cells of the intact mouse lung¹² nor does it diminish adsorption of mumps virus by the chorio-allantoic membrane of the chick embryo.²² Moreover, there is no correlation between the effect of polysaccharide on the reaction between viruses and erythrocytes and their inhibitory activity in viral infections.²² Polysaccharides which are highly active in causing inhibition of multiplication of a virus may have no effect upon either the haemagglutination reaction with or adsorption of the virus by red blood cells. The converse is also true.

Insofar as can be determined, active polysaccharides have no direct effect upon either PVM or mumps virus as such.^{11, 12} Polysaccharides do not demonstrably inactivate these agents *in vitro* nor do they diminish the infectivity titres of the viruses. If there were a direct effect upon the virus it would not be expected that the extent of inhibition would be inversely related to the amount of multiplication which has occurred at the time polysaccharide is injected. Because such a relationship is demonstrable with both agents and be-

cause large quantities of polysaccharide do not lead to a reduction in the amount of virus already present in an infected host, it seems improbable that the effect is due to an action on the virus particle itself.

The existing evidence is inadequate to prove the validity of any concept regarding the mechanism of action of polysaccharides in infections induced either with PVM or mumps virus. Nonetheless, it strongly suggests that inhibition of viral multiplication results from alterations induced in the metabolic activities of the host cells; from an abnormality in step 4 of the scheme, that is, cell metabolite blockade.^{11, 12, 23, 24} It can be shown that the first step essential to the initiation of a viral infection, that is, contact between susceptible cells and virus particles followed by combination, occurs normally in the presence of active polysaccharides. It is evident, therefore, that some later step in the mysterious intracellular process which results in viral multiplication functions abnormally when an appropriate polysaccharide is present. There is no evidence indicating that viruses themselves possess metabolic systems, and there is no reason for assuming that viral inhibition results from the direct action of polysaccharide on entirely hypothetical systems.

The decisive rôle of the host cell in virus multiplication has been demonstrated clearly in many instances. It is well established that numerous procedures which cause deleterious effects upon the host, for example nutritional deficiency or grossly abnormal environmental conditions, decrease susceptibility to viral infections. This suggests that the virus finds in the cells of the subnormal host a metabolic state which is inadequate to support maximal viral multiplication. It appears consistent with present evidence to think that the inhibitory activity of polysaccharides may be explained on the basis that they compete with the virus for some metabolic system within the host cell which is essential for viral multiplication. If the polysaccharide possesses an appropriate chemical structure, is present in sufficient quantity and is given before maximal viral multiplication has occurred, further multiplication could be prevented by the blockade of such a metabolic step in susceptible cells.

One may ask now, what are present prospects for the control of viral diseases with

chemical agents? It appears that a small beginning, although no more than a beginning, has been made. A tiny chink in the armour protecting viruses has been uncovered and this provides a hint that more effective and more useful procedures may be developed if the validity of the underlying concepts is supported by further work. Of major importance in the eventual solution of this problem is information as to the nature of the metabolic systems which viruses require of host cells.

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LEGAL PROBLEMS IN INDUSTRIAL MEDICINE*

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FROM time to time questions arise concerning the consent of an employee for various procedures in the practice of industrial medicine. There are two rather different situations in which the necessity for consent must be considered, viz., (a) consent for examination or treatment, and (b) consent to divulge in-

formation contained in an employee's health record.

An attempt will be made to review the legal principles which are applicable to these two situations.

Consider first, the problem of a patient's *consent for examination or treatment*. It is generally accepted that a doctor may do nothing to a patient without the patient's consent. It is unlawful to carry out an examination or any form of medical or surgical treatment without permission.

The consent need not be in writing. It is not even necessary that the consent be in express words; it may be implied from the patient's conduct and the surrounding circumstances. The fact that an employee voluntarily comes to a doctor's office implies that the employee consents to be examined. If treatment is administered to an employee who does not object, there is an implied consent by the employee to the treatment.

While consent need not be in writing, it is the usual practice to obtain written consent in the case of a major surgical operation. Even for a major operation, consent may be oral or implied. However, it is considered advisable to obtain a written consent for major operations in order to obviate any difficulty later in proving that permission was granted and especially in proving the nature and extent of the operation for which permission was granted.

The fact that an employer has requested an examination of an employee does not dispense with the necessity for the consent of the employee. Where there is no written consent, it should be clear from all the circumstances that the employee consents to the examination.

Consent of a husband or wife (as the case may be) is unnecessary with the possible exception of sterilization operations.

A parent or guardian can give a valid consent for the examination and treatment of a child. Whether a parent's consent is always essential is not too clear. Difficulties may arise where a patient is under twenty-one years of age but of sufficient age to understand the nature and consequences of a proposed operation. Consider for example, the situation where a patient, who is 18 years of age agrees to an operation, but the parents object. A similar problem may arise in the case of an

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employee under twenty-one years of age who agrees to an examination and the examining physician is uncertain whether the consent of the parent must be obtained. In cases of this nature, where an employee is old enough to comprehend the nature of the examination or treatment, the consent of the employee should be sufficient. Where an employee is to undergo a major surgical operation, and the consent of the parent is not obtainable, it would be a wise precaution to have an opinion in writing by two or more qualified medical practitioners, including one surgeon, that the operation is necessary.

In some circumstances, consent for a surgical operation will be implied when a patient is incapable of consenting. This may occur when a person is admitted to hospital in an unconscious condition and requires an operation. If the operation is essential to save the patient's life, the surgeon is legally justified in operating. On the other hand, if the operation could be postponed until the patient is conscious, without endangering his life, the surgeon should wait until the patient's consent can be obtained.

The foregoing remarks have dealt with consent for examination and treatment. It is necessary to distinguish the second situation where consent is material, *viz., consent to divulge information contained in an employee's health record.*

The writer has had occasion elsewhere¹ to review the legal authority for the proposition that a patient may succeed in a legal action against a doctor for disclosing information pertaining to the patient, acquired in the professional relationship. For the purposes of this discussion, it will be assumed, that in certain circumstances, such a legal action may lie.

The present discussion will be devoted to a consideration of a number of situations in which a doctor may reveal this information without fear of legal action. The discussion will begin with the situations in which a doctor may be *required* by law to reveal such information. Then, an analysis will be made of the situations in which a doctor may *voluntarily* reveal the information.

There are two situations in which a doctor may be required to produce a patient's record for inspection.

The first situation occurs in the course of a legal action to which a doctor himself is party.

Where a doctor is either plaintiff or defendant in a legal action brought by the patient, the doctor may be required to produce for inspection all records relating to the patient. The inspection of the records will occur before the trial of the action. The opposing party (the patient) will serve a notice on the doctor whereby the doctor is required to produce the record.

The other situation in which a doctor may be required to produce the record occurs during a trial. In this case it is not necessary that the doctor be a party to the legal action. By serving a subpoena upon the doctor, any party to a legal action may require the doctor to attend court and to bring with him any records which are relevant to the action. In addition to producing the record, the doctor will be required to give evidence in the witness box relevant to the matters in issue. A doctor who produces his records before trial or during the trial of a legal action in the foregoing circumstances is vested with absolute privilege. No legal action will lie against him.

The foregoing deals with two situations in which a doctor may be *required* to produce his records. There are other situations in which a doctor may be willing to produce his records but he is uncertain of his legal position in so doing.

It remains then, to consider some cases in which the doctor may *voluntarily* produce his records without fear of legal action by the patient. The same principles will apply to an oral communication by a doctor of information relating to a patient.

A doctor may disclose information regarding a patient in an affidavit for use in judicial proceedings. Such a disclosure is "privileged" in the same way as a disclosure in the witness box.

A communication by a doctor to his own solicitor, and to a solicitor who is taking his evidence in preparation for legal proceedings, is also "privileged", that is, no legal action will succeed against a doctor for such a communication.

Where the patient consents or requests that a report be given, the doctor is protected. For example, the agent of an insurance company who asks a medical man for a report, should have a consent or authority in writing signed by the patient.

Where a patient has not given consent for a report to be given, a medical practitioner must exercise care to be sure that he is legally protected if he gives the report.

An English writer² cites the example of a syphilitic servant who would not authorize his physician to inform the master of the danger of infection. Kitchen concludes that if the servant sues the physician, the servant "would be almost certain to lose his action, for the doctor would easily be able to show that he made the statement to protect the master's health." The application of this example to present day industrial medicine is clear.

As an alternative to notifying the employer, the doctor could inform the medical officer of health.

Where an employee is suffering from a condition which is hazardous to the health of his associates, there would appear to be little doubt that a doctor is entitled to take any reasonable action to protect the health of the associates including the communication of information to the employer. The legal position is more difficult where the condition of the employee is not hazardous to others but may affect his capacity for work. An employee, for example, may be suffering from impaired vision or hearing, or may be pregnant or may be suffering from mental illness or from some other condition necessitating a change or even termination of employment. Upon these facts or similar facts, is a doctor justified in communicating information to the employer? Where the employee consents to the information being given to the employer, there is no difficulty. For this reason, it seems advisable for the employee to sign a consent form at the time of his initial medical examination. The form could readily cover future examinations. In the absence of such a consent, there is considerable doubt that a physician could divulge this information without legal risk.

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RÉSUMÉ

Revue de certains problèmes juridiques concernant surtout le médecin industriel. L'auteur examine diverses situations où le médecin possède ou ne possède pas le droit de se passer du consentement formel de son patient. Ces situations concernent soit le traitement, particulièrement le traitement chirurgical, soit la communication de renseignements faisant partie du dossier médical du sujet.

PAUL DE BELLEFEUILLE

AN APOLOGIA FOR VAGINAL HYSTERECTOMY

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WE prefer, wherever possible, to do a vaginal rather than an abdominal hysterectomy. As a result of this preference, we have extended the indications for this operation far beyond our original expectation, and now take the abdominal route only when adhesions, or previous pelvic operations, or a very large tumour, prevent us from bringing the cervix far enough down to get safely into the pouch of Douglas. The actual size of the tumour does not so much deter us as this inability to get into the pouch, and we have been able to remove vaginally uteri enlarged by fibroids to the size of a six months' pregnancy. We commonly remove uteri the size of a four months' pregnancy. Nor do we hesitate, whenever it is indicated, to remove tubes and ovaries as well as uterus, and the vaginal operation is the method of choice where any repair work is required in addition. Not infrequently we have removed uteri by this route where a previous fixation or suspension had been done, and in cases of chronic salpingo-oöphoritis: although the difficulties of the operation are greatly increased under such conditions. All we ask is that the cervix has its normal mobility so that we can get into the pouch of Douglas without danger to the woman: in only 12 out of 834 cases have we failed to complete the operation vaginally when this was the case.

Recently we have gone back over all the hysterectomies performed by the three members of the gynecological staff of the Victoria General Hospital, Halifax, from the years 1934 to 1947 inclusive, in an attempt to determine how justified we have been in our preference for the vaginal operation. The results of this study have only confirmed us in our opinion.

Canadian gynecologists, as a whole, do not seem to have accepted the vaginal in preference to the abdominal hysterectomy, except as an adjunct to the cure of prolapse associated with actual uterine descent, where they do it

as part of the Mayo repair. Naturally, the operation is very much easier to do when the cervix can be pulled out of the vagina, than when it is held up in its usual position by an intact ligamenture. It is also easier to do when the perineum is greatly relaxed. It is our contention, however, that when one has mastered it, the operation is not too hard to do in a woman without prolapse, whether she be multiparous, nulliparous or virginal, always granted that the cervix is sufficiently mobile to allow one to get safely into the pouch of Douglas. And when we use the term "mobile" we refer to normal and not abnormal mobility.

In many ways the vaginal is easier than the abdominal operation. For one thing the operator sits down to it and is spared the awkward and tiring angulation of the body

The vaginal operation does have, from the operator's standpoint, one disadvantage: he requires two assistants for proper retraction. Self-retaining retractors make it possible to do the abdominal operation with only one assistant, but although we have tried all manner of vaginal self-retaining retractors in an attempt to eliminate the extra assistant we have found such retractors to be downright abominations. There is nothing for vaginal retraction so good as retractors in human hands. If the operator cannot obtain two assistants, he had better choose the abdominal route or he may wish he had never been born.

The vaginal operation is also very much easier on the patient. The absence of an abdominal wound leaves her in much greater comfort during the first few postoperative days, and enables

TABLE I.
AGE OF PATIENT AT OPERATION.

Operation	Total	Age group						
		-20	20-29	30-39	40-49	50-59	60-69	70 up
Total abd. hyst. alone or c salpingo-oophorectomy.....	504	3	67	166	181	68	15	4
Subtotal hyst. alone or c salpingo-oophorectomy.....	23	-	2	10	5	5	1	-
Vaginal hyst. alone.....	404	-	18	150	157	62	16	1
Vag. hyst. c salpingo-oophorectomy.....	144	-	4	47	47	32	12	2
Vag. hyst. c pelvic floor repair.....	170	-	4	41	54	39	25	7
Vag. hyst. c perineorrhaphy.....	116	-	6	47	45	15	2	1
Total.....	1,361	3	101	461	489	221	71	15
All abdominals.....	527	3	69	176	186	73	16	4
All vaginals.....	834	0	32	285	303	148	55	11

necessitated by the Trendelenburg position. For another, there being no closure of an abdominal wound, the operation can be done in less time than the abdominal, even when one commits that unpardonable sin, a subtotal hysterectomy. We think we are slipping if, in an uncomplicated case, we take longer than 20 minutes: whereas the same type of case handled abdominally will take half an hour or more. In a show-off spirit and with the proper case it can be done in less than 10 minutes. And finally, one is spared that struggle with the bowels that dogs the abdominal operation in these days of pentothal and cyclopropane, before curare is given. We suggest that none of the above considerations is unimportant to the gynecologist who is over forty and should be taking cognizance of ways and means to lift the strain from his ageing cardiovascular system.

her to get up and walk about on the day following operation with much less—indeed often with no—distress. There is also, even when one excludes the more difficult abdominal cases, much less shock with the vaginal operation, with the result that we have felt able to undertake it in old women who are bad surgical risks, in whom we might otherwise have been content with some less serious (and less satisfactory) procedure.

Table I shows that we were able to offer hysterectomy to 66 women over 60 years of age by the vaginal route, but to only 20 in the same age group by the abdominal, and we had no deaths among these 66 women.

The length of stay in hospital is less with the vaginal operation. In the uncomplicated case, a woman who lives in Halifax usually goes home on the eighth day, whereas the same woman operated on abdominally would be kept in hospital at least three days longer. The exception

to this is where some plastic work has to be done in addition to the vaginal hysterectomy, in which cases the stay is approximately the same as that of the abdominal operation.

In these days of rising hospital costs it means a good deal to the average patient—certainly down in our part of Canada—if she can get out of hospital a few days earlier: so does it also if she is able to go back to work earlier. We have no reliable statistics on the latter point, but it is our belief, from what we have been able to observe, that the woman who has had a vaginal hysterectomy can face full work at least a month earlier than the woman who has had an abdominal. Furthermore, the woman who has had a vaginal hysterectomy is able to get about her house and do something to look after herself and her family from the time she goes home: something that the woman who has had the abdominal operation is rarely able to do even with early ambulation.

While in our earlier cases, before we began to use sulfa and penicillin, and before we got our patients up the day after operation, the mor-

bidity in vaginal hysterectomy was higher than in abdominal, such serious complications as bronchitis, pneumonia and paralytic ileus were much less common. But whereas our morbidity in abdominal hysterectomy has remained more or less constant, or with a slight drop, in vaginal hysterectomy it has steadily dropped until it is now much lower than in the abdominal operation. Our criterion of morbidity is a temperature of 100.4° or more occurring after the first 24 hours and lasting 48 hours or more.

It will be seen from Table III that (1) the use of penicillin following abdominal hysterectomy has reduced the morbidity slightly; (2) that the use of sulfa alone following vaginal hysterectomy has reduced the morbidity to a moderate degree; (3) that the use of penicillin alone following vaginal hysterectomy did not cover enough cases to show anything significant; and (4) that the use of sulfa plus penicillin reduced the morbidity greatly in vaginal hysterectomy, but not as much in those cases where some repair work was done in addition as in the hysterectomy alone or combined with salpingo-oöphor-

TABLE II.
DAYS IN HOSPITAL BY OPERATION

Days in hosp.	Total cases	Operation					
		Tot. abd. hyst.	Subtot. hyst.	Vag. hyst. alone	Vag. hyst. with s.o.	Vag. hyst. c repair	Vag. hyst. c perin.
-7	13	5	2	6	—	—	—
7-9	217	11	2	138	43	5	18
10-12	424	130	3	166	59	27	39
13-15	410	215	6	59	24	73	33
16-18	169	77	4	18	11	43	16
19-24	86	44	1	13	5	15	8
25+	42	22	5	4	2	7	2
Total.....	1,361	504	23	404	144	170	116
Average days.....	13.6	15.0	21.3	11.2	11.8	15.4	13.3

TABLE III.
EFFECT OF CHEMOTHERAPY ON POSTOPERATIVE MORBIDITY

	Number of patients and per cent morbidity							
	Before sulph.		Sulpha		Penicillin		Sulph. and Pen.	
	No.	%	No.	%	No.	%	No.	%
Total abd. hyst.....	358	26.2	—	—	146	18.5	—	—
Subtotal hyst.....	23	30.4	—	—	—	—	—	—
Vag. hyst. alone.....	175	34.8	99	23.2	23	17.4	107	3.7
Vag. hyst. c. s.o.....	49	46.9	38	28.9	10	20.0	47	6.4
Vag. hyst. c. repair.....	83	36.1	45	26.7	—	—	42	19.0
Vag. hyst. c. perin.....	33	48.5	22	22.7	8	37.5	53	13.2
Total.....	721	32.0	204	25.0	187	19.2	249	8.8
All abd. hyst.....	381	26.5	—	—	146	18.5	—	—
All vag. hyst.....	340	38.2	204	25.0	41	22.0	249	8.8

ectomy. Our method of using sulfa and penicillin is as follows: before closing off the vaginal vault we inject into the peritoneal cavity about three ounces of a sulfa emulsion, and we give 50,000 units of penicillin every three hours post-operatively for 48 hours. We used to leave a cigarette drain in the pouch of Douglas for 24 hours in our vaginal hysterectomies to take care of any bloody ooze, but discontinued its use following a death from intestinal obstruction where the drain had been the focus around which the obstruction occurred.

We must confess to a rather large number of cases in which there was no demonstrable cause for the morbidity. For the most part this unknown group had no other symptom except the fever, and most of them felt perfectly well. Of the known causes two were more common in vaginal than abdominal hysterectomy— infections of the vaginal vault and pouch of

sult of this safety we have adopted the policy that every woman who comes to us bleeding, after the menopause has been established, has her uterus removed without further ado (unless she has carcinoma of the cervix). What is the alternative to this in women bleeding after the menopause? Curette to make a diagnosis, and then radium and/or x-rays, or abdominal hysterectomy; each of which procedure carries its operative risk. One of us saw four cases of carcinoma of the body become inoperable in whom a diagnostic curettage had been carried out in another hospital. The curettings had been examined microscopically by a pathologist who was a specialist in gynaecological pathology, and thought to be benign. Yet all these women continued to bleed after curettage and eventually returned to hospital hopelessly advanced. Once we mastered the vaginal operation we gave up such fiddling while Rome

TABLE IV.
COMMONEST CAUSES OF MORBIDITY.

Cause of morbidity	All abd. hyst.		All vag. hyst.	
	No.	% distrib.	No.	% distrib.
Abd. wound infection.....	30	23.4		
Infection of vag. vault or P. of D.....	17	13.3	53	25.0
Cystitis.....	3	2.3	20	9.4
Other known causes.....	30	23.4	36	17.0
Unknown causes.....	48	37.5	103	48.6
Total.....	128	100.0	212	100.0

Douglas (pelvic peritonitis), and cystitis. The infection of the vault and pouch appeared to be due most commonly to a collection of blood and when this drained away the temperature dropped immediately. The higher incidence of cystitis occurred in those cases where a repair was done in addition to the hysterectomy, and in which we left an indwelling catheter. This complication has practically disappeared since we have been giving $7\frac{1}{2}$ grains of sulfadiazine every four hours for as long as the catheter is in and 24 hours after it is taken out. Phlebotrombosis occurred as commonly in the abdominal as the vaginal cases, and its incidence does not seem to have been influenced either by early ambulation or sulfa and penicillin.

As has already been stated, one of the great advantages of vaginal hysterectomy is its safety, as reference to Table VI will show. We feel able to undertake this operation in cases where the patient's general condition would deter us from the abdominal route. As a re-

burned. We do the operation in every woman who bleeds from the cavity of the uterus after the menopause, and we teach our students that this is a good thing to do, with the result that we are getting post-menopausal bleeders sent in to us much earlier than used to be the case.

We do the operation as a diagnostic as well as a therapeutic measure. When we have the uterus out and opened we can see with our eyes the polypoidal growth that the curette might have missed, and can send the whole endometrial cavity to the pathologist. If there is definite malignancy or a suspicious polypoidal growth or ulceration, we remove the tubes and ovaries also, and this additional procedure has not added to our mortality. We believe that the mortality of the operation in our hands is no higher than that of a diagnostic curettage in this type of case. If anyone with any experience with the curette in the uteri of old women will search his memory he will recall that this apparently simple operation car-

ries its own very definite mortality, as does the insertion of radium into such a uterine cavity; and if one does the diagnostic curettage today and inserts the radium next week the risk is doubled.

What about the nulliparous or virginal postmenopausal bleeder whose vagina has been shrunken and narrowed by the ravages of *Anno Domini*? We find such shrinkage very seldom so extensive that an episiotomy will not overcome it; and there is an unexpected amount of room in the upper vagina, even in ancient virgins.

Another advantage of the vaginal hysterectomy arising out of its safety is that we can offer it to those cases of pregnancy where an interruption of the pregnancy and subsequent sterilization is felt to be necessary owing to the patient's general condition. I know of no way of dealing with the Fallopian tube that will guarantee against a future pregnancy: no matter how carefully the tube is tied, or what suture material is used, there is always the possibility of the suture devitalizing the tube wall in such a way that the mucosa of the uterine end becomes exposed and canalized. Furthermore, if one is faced with a patient already pregnant who requires a therapeutic abortion as well as sterilization, one has first to empty the uterus (an operation with a considerable risk) and then later open the abdomen to tie off the tubes; in short, two operations and two anaesthetics, and two stays in hospital. The alternative to the above is some form of hysterectomy which does everything at one sitting and produces a certain sterilization, and here the vaginal hysterectomy offers not only greater safety but quicker rehabilitation. We have done this operation up to the fourth month, and it is surprisingly easy to do in such cases if, half-way through, one empties the uterus of its contents. We have had no mortality and no more than the average morbidity in the cases we have handled in this manner: and we began to use this procedure because of a fatality that arose as a result of a therapeutic abortion.

It will be noted that of the 527 cases of abdominal hysterectomy only 23 were subtotal. We apologize even for these, for we hold that it is just as silly to remove the body of the uterus and leave the cervix behind as it is to remove gallstones and leave the gallbladder behind, or

remove a cancerous breast and leave the axillary gland behind. Where we have done the subtotal it was because the difficulty of the operation, and the seriousness of the patient's condition towards its end, forced us to desist from completing a proper job. They were all desperate cases and we had to be content with half a loaf. We are glad to note that the gynaecological world is gradually moving towards the position we have held for 25 years regarding total hysterectomy. At a Congress of the American College of Surgeons 12 years or more ago, we heard an outstanding gynaecologist declare that he never did a total hysterectomy except for cancer of the corpus, contenting himself with a subtotal plus cauterization of the cervical canal. He gave several reasons why the cervix should not be removed: it left a more normal vaginal vault; there was less chance of the vault prolapsing; coitus was more enjoyable. Last year he had an article in the journals recanting all this: he is now a total hysterectomizer. For 25 years we have listened to all the arguments against total hysterectomy, and waited for the Cassandra-like predictions to be visited upon our cases. They never have. We now believe that these predictions were bugaboos used by the frightened to scare the timid. On the other hand we are constantly having to remove stumps of cervixes — or treat them for carcinoma — which others have left behind. Subtotal hysterectomy may be a safer operation for the casual operator, but should the casual operator be doing hysterectomies? It should surely not be a gynaecologist's operation.

In an operation like vaginal hysterectomy, where one is not able always to see as clearly as in the abdominal what one is doing, the question naturally arises: Is damage to the bladder, ureter or bowel more frequent? We damaged the ureter once in the vaginal and once in the abdominal series, and in both series we inadvertently opened the bladder three times. In no case, to our knowledge, did we damage the bowel in the vaginal operation, but we had one faecal fistula following an abdominal. In both cases of damage to the ureter the error was not in cutting it but in catching it in a clamp in trying to regain a slipped bleeding point: we were lucky enough to have both these fistulae heal spontaneously. In all cases where we opened the bladder—and in one vaginal case we opened it widely thinking we were in the ab-

dominal cavity—we finally recognized our sin and repaired the opening: but we did not allow the accident to prevent us from completing the operation. The accident occurred in both abdominal and vaginal operations while we were stripping the bladder away from the cervix—some bladders seem to tear like putty. In vaginal hysterectomy it is much easier (and one can make a better job of it) to repair the hole in the bladder after the uterus has been removed: there is much more room, much better visualization, and the walls of the bladder come together better. In so far as we are concerned, then, bladder, ureter and bowel damage has been no more common in the vaginal than in the abdominal operation; nevertheless, we must confess that we are much more conscious of the possibility of doing such damage during a vaginal operation. Perhaps that consciousness makes us more careful.

There are obvious limits to the scope of the vaginal operation, and we recognize four: (1) where there have been previous pelvic operations via the abdomen with the likelihood of many adhesions, and especially where a suspension or fixation has been done. (2) Where we are clearly dealing with a case of chronic salpingo-oöphoritis, or any other non-mobile pelvic mass such as advanced endometriosis. (3) Fibromyomata that enlarge the uterus beyond the size of a five months' pregnancy; and most important (4) any case in which the cervix has not, for some reason (including any of the above) its normal downward excursion. We have operated on cases in which all the first three limitations were present, but when number four is present we fly immediately to the abdomen, having learned this caution through blood, sweat and tears. We also have noted the following: (1) in women with long vaginas the operation may be surprisingly difficult, and (2) an episiotomy may turn a case that is causing great difficulty into one of surprising ease.

But if there are limits to the vaginal operation so are there to the abdominal. Quite a number of our vaginal operations were done on women in such poor general condition that we would not have risked the abdominal. Nevertheless, we must admit that the limitations to the vaginal are greater than to the abdominal, and that some hysterectomies are impossible except by the abdominal route. The really formidable abdominal operations could not have been done

vaginally. We must further confess that in five cases where we started to do the operation vaginally we had to open the abdomen to complete the removal of the uterus, and in seven cases where we had been able to get the uterus out vaginally we had to open the abdomen to catch an elusive bleeding point. But the extent to which we have been able to replace the abdominal by the vaginal operation is shown in the fact that in the last 15 years in one hospital we have done 834 vaginal as against 527 abdominal hysterectomies.

It will be noted from Table V that we did about as many vaginal as abdominal hysterectomies.

TABLE V.
COMMONEST PATHOLOGICAL CONDITIONS
FOUND AT OPERATION.

Pathological condition	Total	Operation	
		All abd. hyst.	All vag. hyst.
Fibroids.....	419	223	196
Benign uterine bleeding	558	81	477
Adenomatous polypus....	48	—	48
Chr. salpingo-oöphoritis	110	88	22
Endometriosis.....	31	31	—
Cancer corporis.....	44	26	18
Other conditions.....	151	78	73
Total.....	1,361	527	834

tomies for fibroids. Generally speaking, however, the fibroids were small in the vaginal cases, not enlarging the uterus as a rule beyond the size of four months' pregnancy. In the so-called benign uterine bleeding group, however, we did six vaginals to one abdominal, and most of those abdominals were done early in the series before we had thoroughly taught ourselves the vaginal operation. In effect, we never open the abdomen now to take out a mobile uterus smaller than a three months' pregnancy. It will be noted that we did 26 abdominal as opposed to 18 vaginal hysterectomies for carcinoma of the corpus. Once again the abdominals were done early in our series, and we now attempt the vaginal operation in all cases of cancer of the body.

We did vaginal hysterectomy in association with some form of repair in 286 cases. As a rule we do not remove the uterus where prolapse is present unless there is some indication other than the prolapse for its removal. We still feel that, in women from whom age has subtracted the joys of coitus, some form of LeFort's colpectomy seems a safer and as satisfactory an operation; while for those who wish to continue their

matrimonial exercises the Fothergill operation produces a more joyous vagina. However, we are trying to preserve an open mind in this matter, to the extent that in nine cases, all elderly women, we have removed the uterus, without indication on its part, in the course of a repair.

TABLE VI.
DEATHS FOLLOWING
ABDOMINAL AND VAGINAL OPERATIONS

Operation	No. of operations	No. of deaths	Fatality rate percent
Tot. abd. hyst.	504	10	2.0
Subtotal hyst.	23	2	8.7
Vag. hyst. alone.	404	3	0.7
Vag. hyst. with s.o. .	144	—	—
Vag. hyst. with repair	170	1	0.6
Vag. hyst. with perin.	116	—	—
Total.	1,361	16	1.2
All abdominal hyst. .	527	12	2.3
All vaginal hyst.	834	4	0.5

If subtotal hysterectomies are excluded, in which the high death rate was due to the great difficulties encountered, it will be seen that the mortality in abdominal hysterectomies was about four times that in vaginal. Our statisticians tell us that it is not significant, nevertheless it strikes us as odd, that the mortality in 404 vaginal hysterectomies alone, was three times that in the 430 cases in which the tubes and ovaries were removed or some repair work done in addition.

Table VII reveals the somewhat astonishing fact that, despite the introduction of sulfa, penicillin and early ambulation in the handling of the second group, and despite the extended use

TABLE VII.
CASE FATALITIES BY YEARS.

Years	All abdominal hyst.			All vaginal hyst.		
	Ops.	Deaths	Fatality rate	Ops.	Deaths	Fatality rate
1934-41	249	7	2.8	349	2	0.5
1941-47	278	5	1.8	485	2	0.4
Total. . . .	527	12	2.3	834	4	0.5

of blood transfusions and improvements in operative technique, the mortality has remained much the same over the years in both the abdominal and the vaginal cases.

It will be seen from Table VIII that 50% of the total deaths from hysterectomy were in patients who either had fibroids alone, or fibroids

associated with chronic salpingo-oöphoritis. We are not inclined to look upon fibroids as a particularly dangerous entity, or as increasing

TABLE VIII.
DEATHS ACCORDING
TO PATHOLOGICAL CONDITIONS PRESENT.

Pathological condition	Total deaths	Operation	
		All abd. hyst.	All vag. hyst.
Fibroids.	6	3	3
Fibroids plus.	2	1	1
Chr. salp.-oöph.	5	5	—
Benign. uter. bldg.	1	1	—
Ovarian tumour.	1	1	—
Total.	16	12	4

the gravity of the prognosis, unless they are associated with very serious and difficult adhesions, yet in all but one of the cases in which fibroids were the indication for the operation that resulted in death, there was nothing particularly formidable about the operation. Chronic salpingo-oöphoritis, the second commonest pathological condition among the deaths is fortunately very much less common than it was with us in the wicked '30's.

Of the 12 abdominal hysterectomy deaths 4 were due to peritonitis, 3 to pulmonary embolism, 3 to shock and myocardial failure, one to secondary hæmorrhage, and one to intestinal obstruction (the bowel was found gangrenous at the hysterectomy). Of the 4 vaginal hysterectomy deaths 2 were due to peritonitis, one to paralytic ileus and congestive heart failure, and one to pulmonary embolism. The two peritonitis deaths in the vaginal cases occurred before we began using penicillin and sulfa, but the last two deaths occurred in 1947.

The vaginal hysterectomy we do is the one devised by Heaney of Chicago, to which we have added certain slight modifications of our own. If the illustrations in Te Linde's *Operative Gynecology* are followed, the description of the operation which we now append will be read with greater clarity. We feel that, in order to do the operation satisfactorily and with reasonable ease, it is necessary to make sure of the following:

1. An assistant on each side to give proper retraction. Without both of these proper retraction, which means proper visualization well up into the pelvis, is impossible.

2. Certain instruments. The great boon that we personally owe to Heaney is the instru-

ments he has devised for this operation. Until we began to use these we were unable to get good visualization and our clamps were constantly slipping off the pedicles. In addition to the usual set of vaginal instruments, we feel that the following are essential: (a) At least four Heaney clamps—the best hysterectomy clamps we have ever used—which seem never to slip or to wear out. (b) Two Heaney-Simon retractors which we find indispensable for a clear view up into the pelvis after the uterus has been removed so that we can inspect all the pedicles. (c) A Bland or Swift-Joly needle-holder, which enables us to use the needle as a sort of hook, making the transfixion of the pedicles very much easier in the narrow space available. (d) One pair of pickup forceps with long blades. (e) Three Richardson appendectomy retractors for the vaginal walls. (f) A pair of strong, long-handled scissors.

3. A properly placed light. This may seem a ridiculous stipulation, since it should be a *sine qua non*, yet if nurses are left to themselves they invariably place the light too high, so that while it shines into the vagina it does not shine up into the pelvis and so precludes good visualization of the pedicles. The spotlight should be just above the operator's left shoulder, and may have to be changed to his right if there is a bleeding point in the pedicles on the patient's right.

Despite our long experience with this operation we do not now attempt it without the facilities described above. We find that we can preserve our sterile technique better by using a special vaginal sheet, which has a large attached flap which we bring over our lap and fasten with clips at each side of our waist: this keeps our knees out of the wound and the instruments out of our boots.

With a weighted speculum in the vagina, one Richardson retractor holding the bladder up, and one on each side holding the vaginal side walls apart, the cervix is caught with a volsellum on the anterior and another on the posterior lip. The cervix is pulled down as far as it will come, and a circular incision, running slightly up at each side is made just where the vaginal portion of the cervix becomes vaginal wall. If the incision is made too high the vagina will be shortened, but if it is made too low, the plane of cleavage which makes easy entrance to the utero-vesical space in

front, and the pouch of Douglas behind, will be missed, thus greatly hindering the further conduct of the operation.

Having made this incision, the next step is to cut boldly with the scissors through the so-called pubo-cervical ligament, for unless this is done one is likely to dissect upwards at the expense of the uterine wall and miss the peritoneal reflection. But if this ligament is cut through one finds oneself in that easily dissectable space between cervix and bladder that consists of reticular tissue only. The bladder is now pushed up with the fingers or with sharp dissection to the level of the peritoneal reflection. If this reflection can be clearly seen it is opened with the scissors: if not it is left until later. Sometimes the bladder is very thin and almost friable and in pushing it up with the fingers may be opened. The accident should not deter one from continuing with the operation. The hole can be closed at once or, if this is not easy, left until the uterus has been removed when both visualization and mobilization are very much better. In such cases a catheter is left in for 12 days and the patient given sulfadiazine $7\frac{1}{2}$ grains every three hours while it is in.

Having freed the bladder in front the cervix is now pulled up and forward and the cut posterior vaginal cuff pushed backwards with a "swab" on a sponge-holder. As a rule this causes the peritoneum of the pouch of Douglas to bulge into the wound. It is grasped with tooth forceps and opened with long scissors. Usually a small amount of clear fluid escapes and in difficult cases this tells us we are in the pouch. If the peritoneum does not bulge into the wound the tendency is to start dissecting upwards too far forwards so that one keeps pushing peritoneum off the back of the uterus. To avoid this it is necessary to cut in a backward direction. While doing this one keeps wondering if one will cut into the rectum, but we have never had this happen.

With the pouch of Douglas opened the scissors are thrust into it, their blades opened widely and withdrawn: this makes a wide opening into the pouch into which is thrust one of the long-bladed Heaney-Simon retractors. A wet strip, with a tape to which an artery forceps is attached, is then pushed with uterine dressing forceps up into the pelvis and acts as a mop for spilled blood. We find that un-

less we get into the pouch in the manner just described the difficulties of the operation become greatly increased: we therefore make every effort to do so.

The second assistant now puts one Richardson retractor up under the bladder to elevate it off the cervix and the lateral ligaments, and uses another to retract the side wall of the vagina. The first assistant pulls the cervix to the other side. The operator now puts his forefinger up behind and to the left of the cervix and pulls down on the combined uterosacral and cardinal ligament (which seems to us to be all the same structure). The blades of a Heaney hysterectomy clamp are widely opened, pushed up over the ligamentous structure that is being hooked down by the forefinger, and clamped tightly. There is a tendency to clamp too much tissue in this manoeuvre: as a result the uterine, or a large branch of it, may be caught in the upper end of the bite which will slip out while the pedicle is being tied. It is therefore better to catch only ligamentous tissue in this first clamping.

One now cuts the ligament with scissors as close to the cervix as possible, so as to have a thick pedicle, and we stop cutting just before we reach the tip of the clamp since, if we cut further, we are likely to snip a vessel and so get bothersome and obscuring hæmorrhage. For ligature material we use No. 2 chromic catgut throughout on a hernia rather than a cervix needle, since the latter type of needle, with its sharp edge, may cut a vessel in the pedicles. We use this needle on the Bland or Swift-Joly needle-holder, using the needle as a hook, and find that it greatly lessens the difficulty of manipulating the needle in what is sometimes a very small space. The needle is inserted as a rule from before backward and as close to the cervix as possible. After the ligature is tied, we transfix the pedicle with another suture just below the tie and without tying it clip its two ends with an artery forceps, thus enabling us to pull the pedicle down easily. We used to employ the original tie for this purpose, leaving it long, but it slipped on us so often causing hæmorrhage that we made the modification just described, cutting the tie as soon as the pull-down thread has been inserted. It is an advantage in manipulating the needle in all transfixions if the first assistant is armed with

an ordinary needle driver so that he can grasp the end of the needle, after it has been pushed through the pedicle, and pull it through. If the operator, after pushing the needle through the pedicle, lets go of it with his needle-driver and then tries to pick up the point himself, he may find that it has twisted away out of sight and may have to reinsert it again.

Having ligatured the left uterosacral-cardinal ligament and left a pull-down thread on its pedicle, we now shift to the other side. The second assistant holds the top retractor and the volsella, and pulls the cervix down and to the left, while the first assistant inserts a Richardson retractor on his side of the vaginal wall. The operator then proceeds to clamp the right uterosacral-cardinal ligament on the right side, to ligature it and to insert a pull-down thread into its pedicle. For mopping purposes we use gauze swabs on long sponge forceps, and these are also useful for pushing bowel and appendices epiploïces away from the needle-point or clamp.

We now proceed to clamp the right uterine vessels. Their position is best established by putting the forefinger up behind the broad ligament and hooking it down while the Heaney clamp is applied. It is surprising to note how much closer these vessels appear to run to the anterior than the posterior wall of the uterus, and when the clamp is applied its tip points forwards as well as inwards and upwards. Here again the needle carrying the suture is placed as close to the uterine wall as possible. While we generally push the needle from before backwards in doing this, we frequently push it from behind forwards, whichever appears to be the easiest. After we tie the uterines we cut the ligature at once. We used to leave it long so that we could pull the pedicle down, but after it had pulled off a couple of times we learned better.

The assistants now change instruments and the uterine vessels on the left side are clamped and tied in the same way. This leaves the uterus, except when it is considerably enlarged by pregnancy or fibroids, attached only by the upper part of the broad ligaments on each side. In order to get the clamps on these readily, the fundus of the uterus is delivered through the opening in the pouch of Douglas, by pulling vertically upwards on the cervix and hooking a forefinger behind the fundus. If the uterus

will not come with this manœuvre, we use two claw retractors with sharp claws, with which we climb up the posterior uterine wall, pulling it down as we climb. If it still refuses to deliver, we start morcelling it with the scissors. Often it is enough just to cut the cervix away, but if the uterus is greatly enlarged by fibroids, the morcelling process is continued, requiring sometimes a good deal of patience, until delivery of the remnant of the uterus can be effected. As a preliminary to morcellement, we always enter the peritoneum anteriorly and get a Heaney-Simon retractor up under the bladder, partly to protect the latter and partly to aid visualization.

When the body of the uterus has been delivered the broad ligament is clamped with two Heaney forceps—their points directed towards each other—on each side, and the uterus cut away with scissors, leaving a good-sized pedicle. This pedicle is transfixed, tied, and the tie left long with an artery on it, and we find it helps in differentiation if we use a different type of artery forceps on this ligature than we did on the pulldown thread on the uterosacral-cardinal ligament.

But let us return for a moment to the ordinary-sized uterus whose fundus we were able to deliver through the pouch of Douglas without morcellement. While in some cases we have already opened the peritoneal reflection between bladder and anterior uterine wall, in most cases we have not. In the latter event we thrust a forefinger up behind the uterus and press down with it against the anterior peritoneal reflection. If some bladder tissue still remains attached to the cervix between us and the peritoneum, we can now push it away. We then catch up the peritoneum with a tooth forceps or Allis and incise it, opening it widely. The Heaney clamps are now applied to the broad ligaments on each side and the uterus cut away.

What now faces us in the uterus-denuded pelvis? We have the broad ligament with the Fallopian tubes caught in one ligature on each side and this ligature, left long, has an artery forceps on it. Below this we have the pedicle of the uterine vessels whose ligature was cut short. Below this again we have the pedicle of the uterosacral-cardinal ligament, with a pull-down thread through it just this side of the tie which was cut short, and the pulldown thread has an artery forceps on it different from the one of the pedicle of the broad ligament. If the

uterus was very large there may be one or two additional pedicles on each side.

We now proceed to inspect all these pedicles, by placing a Richardson retractor on each vaginal side wall, a Heaney-Simon under the bladder and another in front of the rectum. By pulling on all these and perhaps pushing bowel or omentum up out of the way with a swab on a sponge-holder, the entire pedicle area can be readily viewed and any bleeding point clearly seen and dealt with. There is frequently—indeed it occurs in the majority of cases—considerable oozing from the posterior vaginal cuff. This requires no special attention since it is controlled by the final running suture which closes the vaginal vault, although occasionally earlier in the operation we may have been forced to secure and tie a spurter.

By pulling down the broad ligament pedicle we can inspect the tubes and ovaries. The removal of these is a much more difficult undertaking with the vaginal than with the abdominal operation. In a considerable number of cases they lie high up at the side of the pelvis and the infundibulo-pelvic fold will not stretch. In these cases getting the Heaney clamp on the fold above the ovary may tax one's ingenuity. We always do this under direct vision, using the Heaney-Simon retractor to hold the bladder forward and pushing the bowel up out of the way with the swab on the sponge-holder. Despite the added difficulty of removing the tubes and ovaries, it does not seem to increase the mortality or morbidity of the operation. On one or two occasions, after removal of the uterus, we have found ourselves faced with an ovarian cyst too large to be delivered without puncturing it. In such cases, rather than risk a spill of potentially malignant cells in the peritoneal cavity, we have completed the operation in the manner to be described and then gone into the abdomen after the cyst.

The operation is completed in this fashion. A cervix needle, threaded with the No. 2 chromic catgut that we have been using throughout, is pushed through the anterior vaginal mucosa at one of the outer angles of the wound. We will call this suture the tiedown stitch. In order to get good visualization for this, the bladder is pulled up with a Richardson retractor. The needle is now pushed through the peritoneum as close to the broad ligament pedicle as possible, and to make this easy the pedicle is drawn

down by pulling on its ligature which was previously left long with an artery forceps on it. Sometimes the peritoneum retracts fairly far up into the pelvis and has to be sought for. We now use two long Allis forceps for this purpose and with them climb our way step by step up the raw surface of the bladder until we reach the peritoneum.

The needle now goes through the pedicle of the broad ligament on *this* side of the ligature on it, so that when it is pulled on there is no danger of pulling off the ligature. When this has been done the ligature is cut. The pedicle of the uterine vessels is now picked up with the long-bladed pickup forceps and the needle pushed through it in the same fashion. Sometimes, especially in older women, this pedicle is small and friable and the needle pulls out: if it does this we let the pedicle go rather than persist in tearing it to such an extent that its ligature may slip. We now pull down on the pulldown thread that runs through the stump of the uterosacral-cardinal ligaments and catch this pedicle in our stitch. When we have done so we pull out the pulldown thread and discard it. We now pick up the posterior peritoneum, put the needle through it and then through the posterior vaginal mucosa, and we have a suture which, when tied, brings all the pedicles down into the angle of the vaginal wound. As a general rule, after we have got the needle through the stump of the broad ligament, we remove the Richardson retractor which was holding the bladder up and insert Heaney-Simon in its place. The long blade of this retractor goes so much farther into the pelvis that when it is pulled on, complete visualization of all the pedicle area is obtained, greatly facilitating the insertion of the rest of the tiedown stitch we have just described.

We do not tie this tiedown stitch immediately but catch its long ends in a forceps and leave them hanging while we inspect the pedicle area on the other side. To tie this stitch immediately means to contract the circle of the wound to such an extent that visualization of the pedicles on the other side is not easy and, if there is oozing or a bleeding point it makes the securing of these difficult. If there is any bleeding point in the pedicles it is caught by a long tonsil artery forceps and tied. If there is oozing we oversew the area with No. 1 plain catgut on a small non-cutting needle, which we insert

superficially in the pedicle area to avoid the ureter.

When both sides have been secured in the tiedown stitches, a Heaney-Simon retractor is inserted fore and aft and the pedicle areas again inspected. If there is no bleeding except the oozing from the posterior cuff, we pull out the tape-pad and tie the tiedown stitches at the angles of the wound. We now thread a long end of one of these tiedown stitches on our needle again and use it to close the rest of the wound, going from before backwards through vaginal mucosa, bladder peritoneum, peritoneum of pouch of Douglas, and posterior vaginal mucosa. This stitch when pulled tight will finally stop the oozing in the posterior cuff. Before tying it, a Heaney clamp is thrust into the pelvis and its blades opened. We then push up a ten inch length of inch wide gauze on a uterine dressing forceps to mop up any loose blood that remains in the pelvis and when the latter is dry we squirt through the same hole into the pelvis about three ounces of a sulfa emulsion and finish the job by tying the stitch we have just been running across the top of the vagina to one of the ends of the already tied tiedown stitch on the other side.

If there is still some oozing from the posterior cuff we may pack the vagina, but this is exceptional. On one occasion, where there was a great deal of oozing from the pedicle stumps which we could not control, and where the patient's condition did not warrant entering the abdomen, we put in a large de Ribes bag, inflated it with water and pulled it down tightly over the pedicle area, later attaching it to a full ginger ale bottle which hung over the foot of the bed. This was removed after 12 hours.

A word about episiotomy. We do this as a preliminary measure under the following conditions (1) where we do the Schauta vaginal hysterectomy for early carcinoma of the cervix, (2) where the patient is a virgin, (3) where in postmenopausal married nulliparae the introitus has undergone shrinkage, and (4) in women with long vaginae where the cervix looks far away. It is surprising how much closer this procedure brings one to the seat of operation, and on occasion it has saved us a lot of sweat and pother.

Our apology for describing the operation in such detail is that we felt that some of the wrinkles included in it, which we ourselves had to learn the hard way, might prove more helpful than leaving it at a bare textbook description, or not describing it at all. As we look back, the greatest difficulties we encountered were due to the following. (1) Failure to get proper visualization—which the Heaney-Simon retractor overcame for us. (2) Failure to get the proper plane of cleavage between cervix and bladder—which we overcame by making our incision high enough up on the cervix and then cutting boldly through the pubo-cervical ligament with the scissors. (3) Failure to get into the pouch of Douglas, which we overcame with the high incision and by cutting backwards against tissue rather than forwards. (4) Doing the operation on cases where one or more previous pelvic operations had been performed. (5) Trying to secure elusive bleeding points in the pedicle area, which occasionally forced us to open the abdomen.

CONCLUSIONS

As a result of our experience with hysterectomy, we believe (1) that the vaginal operation is much safer than the abdominal, being associated with a considerably lower morbidity and mortality, and should be done in preference to the abdominal wherever possible; (2) that while it is, technically speaking, a more difficult operation to master, it actually becomes, when once mastered, an easier operation than the abdominal and one that can be performed in shorter time; (3) that, beyond offering additional safety to the patient, it confers the economic boon of allowing her out of hospital and back to work considerably sooner.

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“There are some to whom pursuit of security appears to be a wrong aim. They think of security as something inconsistent with initiative, adventure, personal responsibility. That is not a just view of social security as planned in this Report. The plan is not one for giving to everybody something for nothing and without trouble, or something that will free the recipients for ever thereafter from personal responsibilities. The plan is one to secure income for subsistence on condition of service and contribution, and in order to make and keep men fit for service. . . . It can be carried through only by a concentrated determination of the British democracy to free itself once for all of the scandal of physical want for which there is no economic or moral justification.”—From the Beveridge Report.

PROPYL THIOURACIL IN THE TREATMENT OF HYPERTHYROIDISM*

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DURING the past five years there have been notable changes in the treatment of hyperthyroidism. The credit goes to Astwood,¹ who carried out experimental studies on various goitrogenic agents and introduced 2-thiouracil and later 6-n propyl thiouracil to clinical use.

These drugs act directly on the thyroid gland, where they prevent the synthesis of iodine into thyroxine. They have no effect on thyroxine which has already been formed. If given over a sufficient period of time and in adequate dosage, they bring hyperthyroidism under control and cause a fall in the basal metabolic rate to normal or even subnormal levels.

Thiouracil was released for clinical use in 1943. It soon became evident that, while the drug was effective in controlling hyperthyroidism, it was not ideal, in that toxic reactions accompanied its administration in from 10 to 15% of cases. These toxic manifestations included drug fever, skin eruptions, mouth infections, swelling of the salivary glands, and—most serious of all—a depressing action on the white blood cells. Agranulocytosis occurred in from 2 to 3% of cases, with a resultant mortality rate of from 1/2 to 1% (McCullagh²).

The search for a drug which would have a similar action on the thyroid but with a less toxic effect led to the discovery of propyl thiouracil. This became available in 1946.³ We now have sufficient clinical data to make a proper appraisal of the value of this drug. This can best be done by comparison of the results obtained by propyl thiouracil with those obtained by iodine.

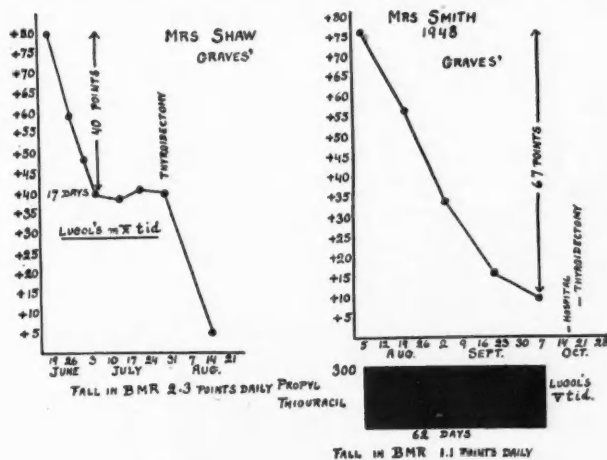
Chart 1 shows the effect of iodine on a patient with diffuse toxic goitre (Graves' syndrome) who had had no previous medication. At the beginning of treatment, on June 19, the basal metabolic rate was plus 80. On July 6, after 17 days of treatment, the basal metabolic rate was found to have fallen to plus 40, a drop of 2.3 points a day. Even though iodine therapy was continued, no further improvement

*From the Department of Surgery, the Montreal General Hospital.

was obtained until thyroidectomy was performed.

This is an excellent response to iodine and it illustrates some important characteristics of iodine treatment. The initial improvement is rapid. The maximum benefit occurs in from 10 days to three weeks. The improvement is, however, only temporary, even though iodine treatment is continued. Thyroidectomy must be performed without delay, before the basal metabolic rate starts to rise again. In some cases the maximum improvement is insufficient to permit of subtotal thyroidectomy being performed with safety, and staged operations then become necessary.

Compare this chart with Chart 2, which illustrates the effect of propyl thiouracil in a



then given and after 13 days thyroidectomy was performed. By the time she left hospital the heart had regained a normal rhythm.

In the second case, as shown in Chart 4, there was an associated advanced luetic aortitis. On this account the internists gave the patient a maximum life expectancy of only two years. Here was an ideal case to carry along with propyl thiouracil without resort to surgery. It was given in doses increasing from 150 mgm. a day to 400 mgm. a day over a period of 66 days. During the entire period she was at rest in bed in the hospital. At the end of treatment the basal metabolic rate was higher than it had

Clinically it has been found that the longer the thyrotoxicosis has been present, the slower is the response to propyl thiouracil. When the hyperthyroidism is of short duration, the response is more rapid.

There is delayed response in patients who have had previous iodine treatment. Here there is a storage of thyroxin in the colloid-filled vesicles and, as already stated, propyl thiouracil has no effect on preformed thyroxin.

In patients with diffuse toxic goitre (Graves' syndrome) who have had no previous iodine treatment there will, with adequate dosage of propyl thiouracil, be a daily drop of 1.3 points

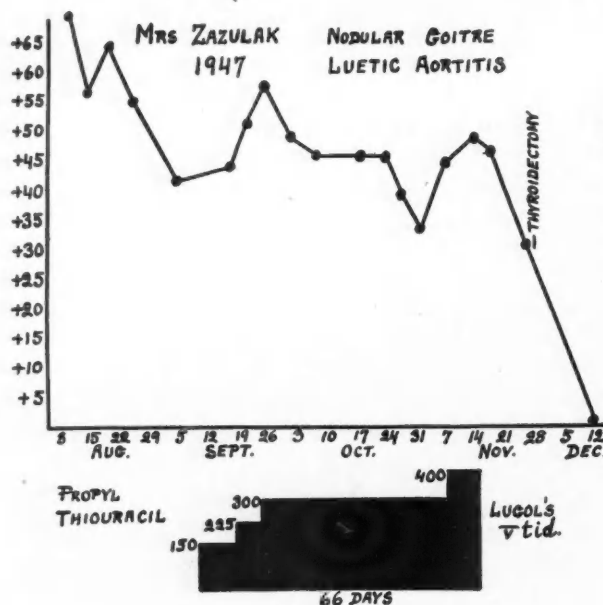


Chart 3.

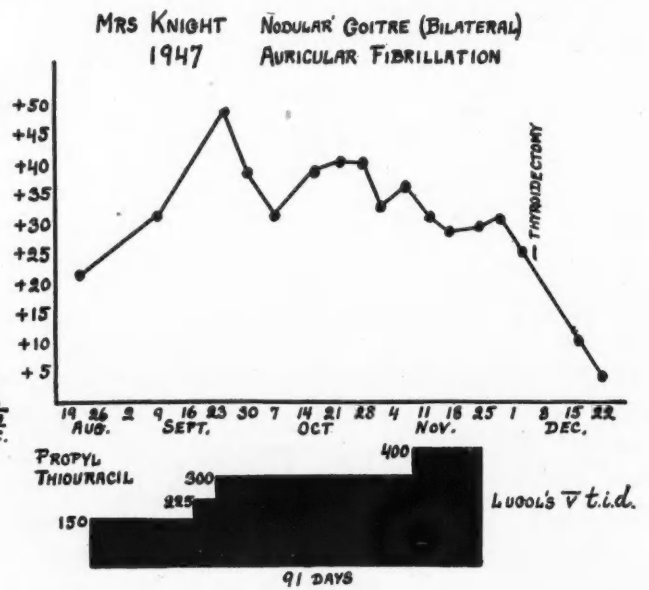


Chart 4.

Chart 3.—Basal metabolic rate curve showing failure of response to propyl thiouracil in case of toxic nodular goitre. Chart 4.—Basal metabolic rate curve showing failure of response to propyl thiouracil in a second case of toxic nodular goitre.

been at the start. Iodine was then given for ten days, with improvement, and thyroidectomy performed without further delay.

Such failures are uncommon, but they do occur. Whether they are due to lack of absorption of the drug, I cannot say. Cases have been reported in which, after inadequate response to propyl thiouracil, satisfactory results have been obtained from methyl thiouracil. We have had no opportunity of checking this.

Slow response as an economic factor.—The rate of response to propyl thiouracil depends on how long the thyrotoxicosis has been present, whether or not there has been previous iodine medication, and what type of goitre is being treated.

in the basal metabolic rate. Thus, in a case of diffuse toxic goitre with a basal metabolic rate of plus 50, forty days would be required to bring the basal metabolic rate down to normal.

A word now about nodular goitre. This occurs more often in the older age groups, and the cardiovascular system seems to bear the brunt of the toxicity. It is in these thyrocardiacs that one would hope for rapid improvement with propyl thiouracil, so that auricular fibrillation and cardiac decompensation could be relieved as soon as possible. Unfortunately, in this type of goitre the response is slower; one can expect a drop of only half a point a day. Thus, in a case of nodular goitre with a basal metabolic rate of plus 50, it would

take 100 days to bring the basal metabolic rate to normal.

The length of time required to bring the basal metabolic rate to normal by means of propyl thiouracil constitutes a real economic problem in some instances. Many of the patients we are called upon to treat come from distant points. Some of them have already been admitted to hospital and may have had iodine therapy. To prepare such patients for operation by means of propyl thiouracil means the expense of a prolonged stay in hospital. Either that or the expense of a trip back home and a return trip to hospital when it is estimated that the basal metabolic rate will be normal. It is for this reason that a large percentage of such patients at the Montreal General Hospital are still prepared for operation with iodine rather than with propyl thiouracil. This applies especially to the mildly or moderately toxic types, where iodine therapy over a period of from 10 days to two weeks gives sufficient improvement to allow thyroidectomy to be done safely in one stage.

Where the patient lives within easy distance, preoperative preparation with propyl thiouracil has no economic disadvantage. From the basal metabolic rate and an analysis of the case one can estimate how long a time will be required to bring the rate down to normal. Arrangements can then be made to have the patient admitted to hospital at the appropriate time. While following the treatment the patient can remain at home and in most instances continue to work. Warning as to possible toxic reactions must be given, and the basal metabolic rate should be checked every two weeks to determine progress. In this way, only a minimal stay in hospital is required, with resultant saving to the patient.

Toxicity.—Propyl thiouracil is definitely less toxic than was thiouracil. Lahey⁵ has reported toxic reactions in only 2% of cases. When they do occur, these reactions are similar in type to those produced by thiouracil, including depression of white cell elements. Bartels⁶ has reported one case of agranulocytosis, with recovery. To date there have been no reported fatalities from propyl thiouracil. It is well, however, to bear in mind that the drug is potentially toxic. It should be given under strict supervision, and the patient should be

warned to stop it at once if sore throat or other manifestations develop.

At the Montreal General Hospital we have to date seen only three toxic reactions to propyl thiouracil. In one case the drug was discontinued because of the development of leucopenia. In the second case, a generalized skin rash appeared after treatment for one week. The third patient developed drug fever. She had previously taken thiouracil, as prescribed by her family doctor, over a period of three years, in an attempt to obtain a medical cure. After she had gone without medication for three months, her basal metabolic rate was found to be plus 67 and she exhibited all the characteristics of Graves' disease. Propyl thiouracil was prescribed. After taking 200 mgm. she became violently ill, vomited, and had a high fever. The drug was immediately stopped, and she recovered in a few days. A 50-mgm. tablet of propyl thiouracil was then given, and she again developed high fever and vomiting.

Operative difficulties.—Where propyl thiouracil is the sole preoperative medication, operation is rendered technically difficult because of increased friability of the gland and excessive bleeding. This advantage can be overcome by stopping propyl thiouracil ten days before operation and substituting iodine.

CURATIVE VALUE OF PROPYL THIOURACIL

Up to this point I have confined my remarks on propyl thiouracil to its use as a preoperative treatment. Some consideration must now be given to the prolonged use of this drug as a therapeutic measure to cure hyperthyroidism without resort to surgery. As we have had no experience in using propyl thiouracil in this way, it will be necessary to study the results obtained in other clinics.

It would appear that in unselected cases, even if the basal metabolic rate has been kept down to a normal level for nine months or more, relapses occur in 50% of cases within a few months of cessation of treatment. This high percentage of failures is perhaps not surprising if one remembers that propyl thiouracil causes increased hypertrophy and hyperplasia in the thyroid. It seems hardly logical that a drug which accentuates the microscopic picture of Graves' disease should be effective in curing the same disease.

If this method of treatment is restricted to cases of mild hyperthyroidism where the goitre is small, a higher percentage of permanent remissions may be obtained. However, it seems to me that the uncertainty of obtaining a cure does not justify such prolonged treatment and the associated risk of toxic reactions.

Medical treatment may prove effective in recurrent hyperthyroidism if the basal metabolic rate is below plus 30 and there is no palpable enlargement of the stumps of the thyroid. Further operative interference in these cases is a difficult procedure and the danger of injury to the parathyroids and the recurrent laryngeal nerves is much greater than at the first operation. Two such patients were treated with propyl thiouracil. It is of interest that both had shown clinical evidence of hypothyroidism, with a subnormal basal metabolic rate after operation. Hyperthyroidism did not develop until two years after operation in one instance and three years after operation in the other. Both patients have now been quite well for six months since propyl thiouracil was stopped. It is not advisable to employ medical treatment in more severe cases of recurrent hyperthyroidism, especially if there is gross enlargement of the thyroid stumps, because the results are unlikely to be satisfactory.

Attempts to cure cases of toxic nodular goitre by the prolonged administration of propyl thiouracil should be condemned. While the drug will control the hyperthyroidism in these cases, it will not cause an adenoma to disappear and the danger of malignancy is still present. At the Montreal General Hospital 6% of the nodular goitres which have been removed by operation have shown malignant changes. Surgical removal of nodular goitre is, therefore, the treatment of choice.

It has been brought to my attention that some practitioners have been giving propyl thiouracil as a treatment for non-toxic nodular goitre. There is, of course, absolutely no justification for this.

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VISUAL MANIFESTATIONS OF HEAD INJURIES*

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MOST of the ocular abnormalities which are found after head injury fall into three groups: (1) in which the globe itself is injured; (2) derangement of ocular motility; and (3) lesions of the visual pathways. This paper deals only with the lesions of the visual pathways that occurred in veterans of World War II who have been seen at Christie Street Hospital Eye Clinic.

Traumatic involvement of the visual pathways exclusive of the eyeball is almost wholly confined to two areas, (1) the optic nerve, and (2) the geniculo-calcarine radiation and visual cortex. The frequency of optic nerve injuries varies from 0.5 to 1.5% of all traumatic head injuries.^{1, 2} In Turner's series of cases, the optic nerve was the third most frequently damaged of all the cranial nerves, being surpassed only by the olfactory and the facial nerves. Thus the optic nerve is more often involved than any of the oculo-motor group.

LESIONS OF THE OPTIC NERVE

The optic nerve may be injured directly, either by a projectile or by injury to the nerve from a fracture of the optic canal. However, by far the commonest type of injury which results in partial or complete optic atrophy is a closed head injury without radiological evidence of fracture of the optic foramen.

The degree of violence need not be very severe, occasionally being so slight that the patient is momentarily dazed, with perhaps no external signs of violence. The nature and site of the impact is commonly directed against the forehead, or is in the neighbourhood of the external angular process on the side of the lesion. The effect is instantaneous loss of vision which is often complete. In those cases in which partial recovery occurs, improvement in vision starts in three or four days and progresses rapidly. At the end of three to four weeks there is no further improvement in vision.

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In cases resulting in partial optic atrophy, the visual field defects fall into two main groups: (1) that in which a scotoma is the main feature; (2) in which a peripheral sector defect is found. The peripheral loss of field is more common, with the inferior sectors more frequently involved. A superior altitudinal hemianopia is uncommon.

In severe injuries of the optic nerve the pupils are usually equal. The pupil on the affected side reacts sluggishly or not at all to direct light but reacts briskly to consensual light. Inequality of the pupils does not occur unless there is an associated third cranial nerve lesion or traumatic mydriasis.

Ophthalmoscopically in the early stages there is no change in the papilla. Pallor of the optic disc usually becomes apparent towards the end of the third week. In minor degrees of injury, the appearance of pallor of the disc occurs later and in some cases never becomes noticeable.

There is some confusion in regard to radiological demonstration of basal fractures extending into the optic canal. Pfeiffer³ states that he has seen only two cases of fracture of the optic canals in a study of a large series of those cases at The Institute of Ophthalmology, Presbyterian Hospital, New York City. He further states that on examining a large number of skulls in the United States Army Medical Museum of various forms of war injuries, the optic canal was invariably spared, even in those in which much bone was shattered. Turner² reporting 33 cases of traumatic optic atrophy following closed head injuries, found only one case with fracture and apparent compression of the optic nerve, and 2 cases with extremely fine fissures running into the lower part of the canal from the lateral side. On the other hand Rodger⁴ demonstrated distortion fractures of the optic canal in 9 of 13 cases.

Anatomically the optic nerve may be divided into three parts, the intra-orbital portion being about 25 mm., the canalicular about 4 to 10 mm. and the intracranial portion 10 mm. The orbital portion has considerable slack to allow for movement of the eyeball but the canalicular portion is closely bound on its superior aspect to its dural sheath and to the periosteum. Because of the immobility of the canalicular and intracranial portions of the nerve, indirect injury can take place at those sites.

The blood supply of the optic nerve has been studied by Abbie⁵ and by Wolff.⁶ The canalicular portion of the optic nerve is supplied partially by small branches from the ophthalmic artery in its course through the canal. A pial network of blood vessels surrounds the

nerve and sends arteries at right angles into the nerve. These vessels are covered by a coat of pia and glial tissue and form the septa, dividing the nerve into a large number of separate bundles. In the nerve these vessels divide and send branches forward and backward. There is a second source of blood supply which is derived from the recurrent branch of the central retinal artery after it enters the nerve. This branch extends posteriorly as far as the optic canal.

There is considerable difference of opinion existing as to the pathogenesis of indirect injury of the optic nerve. The most probable explanation in the majority of cases is that enunciated by Turner,² who postulated that a hæmorrhage or thrombosis occurs at the time of injury, with resultant softening in the substance of the nerve. Since there is slight possibility of movement of the intracanalicular portion of the optic nerve, a blow on the fore-



Fig. 1.—Metallic foreign body lying in the apex of the orbit.

head will result in a sudden jarring of the nerve against the bony wall of the canal. This may be sufficient to rupture small vessels in the septa of the nerve with resultant thrombosis and softening. The central scotomata may be due to damage of the recurrent branch of the central retinal artery, while the more common type of sectorial hemianopia may be due to damage of the vessels entering the nerve from the pial anastomosis. Unfortunately as yet no post-mortem examination has been available to confirm this hypothesis.

Twenty-five cases of traumatic optic atrophy were seen at Christie Street Hospital Eye Clinic during the past three years. Nine of these

had an associated penetrating wound of the skull with resultant damage to brain tissue by the missile itself, or indriven bone fragments.

CASE 1

J.R.C. was wounded on August 14, 1944 by an armour piercing shell exploding in his tank. He was unable to move his left eye in any direction for three months following the injury but this gradually improved so that at the present time he has almost full range of ocular movement. Roentgenogram (Fig. 1) revealed a metallic foreign body lying in the apex of the orbit which caused direct damage to the nerve. The peripheral fields (Fig. 2) were plotted thirteen months later.

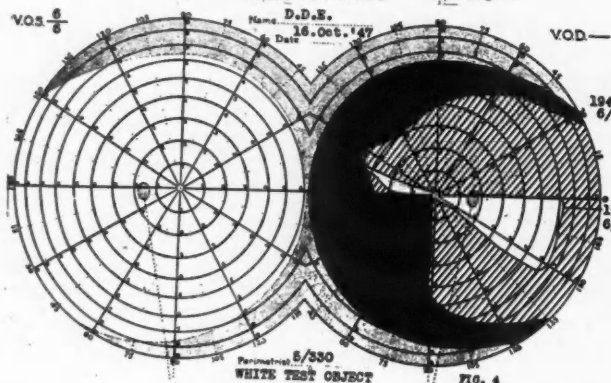
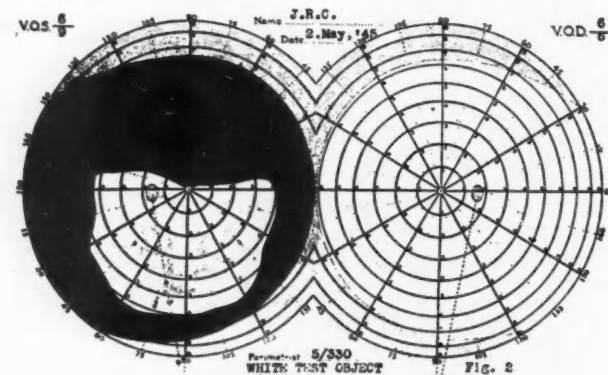
The 16 remaining cases developed optic atrophy following indirect damage to the optic nerve from a closed head injury. Three of these showed fissure fractures of the optic canals.

A common field defect in partial optic atrophy is a peripheral sector loss.

CASE 2

L.E.L.W. was in a jeep accident on June 4, 1945, resulting in a closed head injury with a fracture of the lateral wall of the left orbit. He stated he could not see out of the left eye for one week. Following this, he noticed double vision for one month, while at the present time he shows no abnormality of his muscle balance.

Ophthalmoscopically, his left optic nerve head revealed slight pallor of the inferior nasal sector. The resultant peripheral sector loss (Fig. 3) shows a characteristic appearance.



CASE 3

D.D.E. was accidentally hit over the right forehead with a baseball bat in June, 1941, while catching in an official game. He was slightly dazed but managed to finish the game in the catcher's position. This accident resulted in a closed head injury. Ophthalmoscopically, a marked pallor of his optic nerve papilla developed four weeks after this injury. The peripheral fields (Fig. 4) show a progressive loss of field in one eye over a two-year period.

LESIONS OF THE OPTIC TRACT

Two cases of optic tract lesions were observed. They were diagnosed on the basis of the route of the projectile. The resultant field defects were hemianopic in character with a tendency to incongruity. There was no apparent optic atrophy after three years.

LESIONS OF THE GENICULO-CALCARINE RADIATION AND VISUAL CORTEX

Lesions of the geniculo-calcarine radiation and visual cortex are of particular interest to the neurosurgeon and the ophthalmologist. Holmes' study of occipital wounds during World War I is the basic work in this field and from it has evolved the present concept of the projection of the retina on the visual cortex. The anatomical details are so well correlated

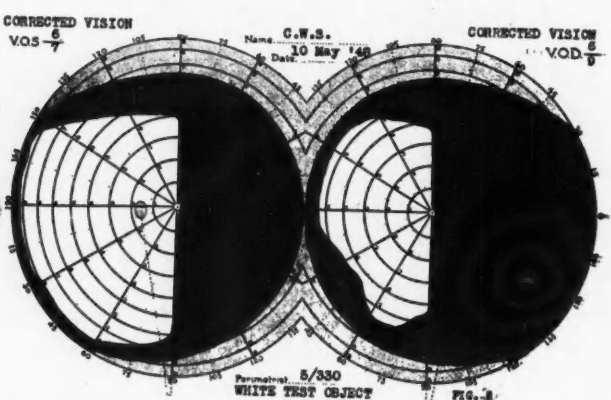
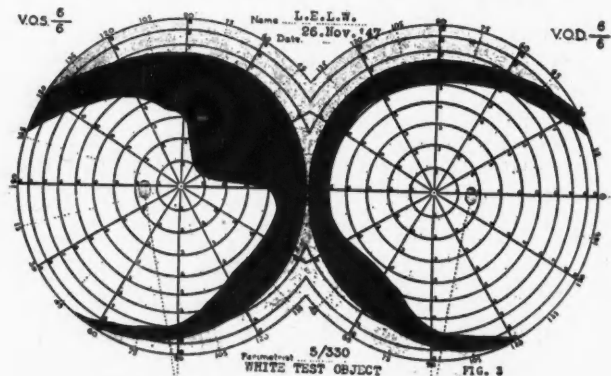


Fig. 2.—Reveals a peripheral field constriction with an altitudinal hemianopia occurring from a missile causing direct damage to the optic nerve. Fig. 3.—Reveals a peripheral field sector loss occurring in a closed head injury. Fig. 4.—Shows a progressive loss of peripheral field in one eye over a two-year period following a closed head injury. Fig. 5.—Reveals a right congruous homonymous hemianopia with sparing of the macula resulting from a motor-cycle accident with no fracture of skull.

that from careful visual field studies the specific area of cortex involved may usually be deduced.

Twenty-five cases showing field defects due to involvement of radiation or cortex are included in this study at Christie Street Hospital. In all but 3 cases the defect has been caused by a penetrating skull wound with resultant damage to brain tissue by the missile or in-driven bone fragments.

CASE 4

C.S.W. was in a motorcycle accident in 1943 in Sicily. There was considerable post-traumatic amnesia but no roentgenographical evidence of fracture of the skull. During convalescence he noticed a defect of the vision of each eye (Fig. 5).

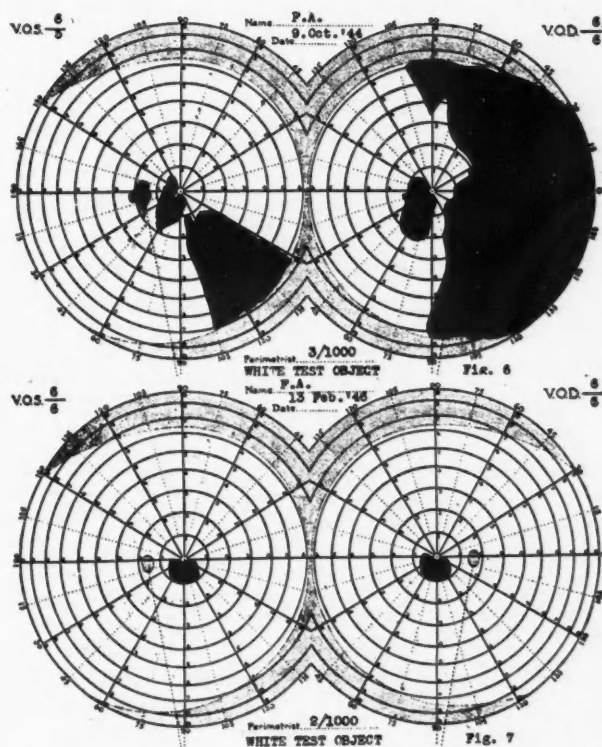


Fig. 6.—Incongruous defects in visual fields charted one month after being grazed in the occipital region by a machine-gun bullet. The skull was not fractured. Fig. 7.—Perimetric fields of the patient concerned in (Fig. 6), 3 years after original wound.

CASE 5

F.A. was grazed in the occipital region by a machine-gun bullet in September, 1944. He did not lose consciousness and the skull was not fractured. However, he did suffer an immediate and marked impairment of the visual fields (Fig. 6) which were charted one month after injury. The fields subsequently improved but there is a residual inferior paracentral scotoma in each eye as charted 3 years later (Fig. 7).

CASE 6

B.S.A. received a very trivial head injury which was not remembered by the patient. During the following year personality changes were noted and after investigation a diagnosis of right-sided subdural hæmatoma was made. The ventriculogram (Fig. 8) is presented. Pre-

operative fields (Fig. 9) revealed a left lower quadrant defect which was almost congruous. After operation the peripheral field loss disappeared. A field defect in cases of subdural hæmatoma is rare.

The visual defects of the remaining 22 occipital lobe lesions vary from congruous homonymous scotomas through congruous homonymous hemianopia to congruous loss of three-quarters of the peripheral field.



Fig. 8.—A ventriculogram in subdural hæmatoma.

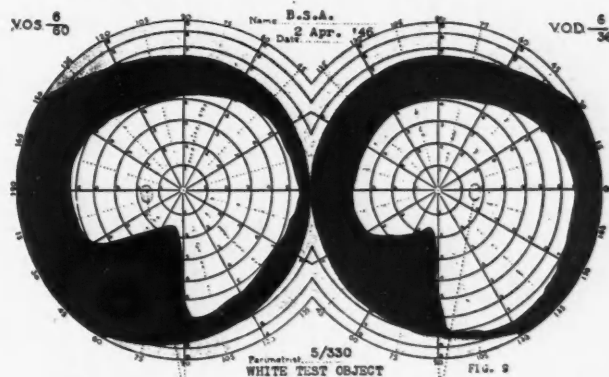


Fig. 9.—Preoperative perimetric fields of patient concerned in (Fig. 8).

CONCLUSION

Fifty-two cases of head injuries with ocular involvement have been studied at Christie Street Hospital Eye Clinic.

In 25 cases the optic nerve was affected resulting in varying degrees of loss of visual acuity and optic atrophy. Fracture of the optic foramen was found in only 4 cases.

Only 2 lesions affecting the optic tracts were observed.

In 25 cases the injury affected the optic radiation and visual cortex. These cases revealed marked loss of field with slight loss of visual acuity.

The author is indebted to Dr. F. R. Clinckett for his assistance in collecting the clinical data and to Dr. J. E. Burke for the review of the radiological findings.

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HYALURONIDASE INHIBITORY SUBSTANCES IN SERA FROM PATIENTS WITH RHEUMATIC DISEASE

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PART II.†

IN the past year it was decided to initiate studies of streptococcal hyaluronidase inhibitory substances in sera from patients suffering from a variety of so-called diffuse collagen diseases. The most readily available cases were rheumatoid arthritics under treatment in the Arthritis Clinic of Queen Mary Veterans' Hospital¹ and this group was supplemented by a smaller number of rheumatic fever cases available in the same institution, plus some in the Children's Memorial Hospital.²

An investigation was started with a view to establishing possible correlations between variations in titre of hyaluronidase inhibitory substances and variations in clinical status of patients.

I. METHODS

A. *Clinical evaluation of the patient.*—Each patient observed during the study was followed both clinically and from the laboratory aspect by one of the authors (Lyon Lapin). The patient's history was elicited personally and a

complete physical examination was carried out. A further physical examination was subsequently carried out every 2 or 3 weeks at the time of the serological studies.

For the rheumatoid arthritic group a special effort was made to assess their clinical progress uniformly. For this purpose it was decided to employ the therapeutic score card method used in the Arthritis Clinic of Bellevue Hospital, New York, as prepared by Steinbrocker and Blazer (1946). It was felt that this system was well suited to the purposes of this investigation because of the emphasis placed upon the degree of inflammatory activity. For the remaining cases (rheumatic fever, etc.) an effort was made to evaluate their clinical condition also in a roughly quantitative manner, for purposes of showing their progress in graphic form. By considering such factors as temperature, pulse, sedimentation rate, functional capacity (confined to bed, bath-room privileges, etc.) and other objective findings on physical examination, e.g., congestive failure, intercurrent infections, electrocardiogram findings, a clinical index was arrived at for each patient, using 100 as the perfect score. In this way it was possible to depict graphically, in a relative fashion, the improvements or relapses in any patient's condition from time to time.

B. *General laboratory data.*—In order to support the general clinical evaluation of the cases, the following examinations were done routinely:

1. Hematological studies consisted of hæmoglobins, white blood cell counts and differentials, erythrocyte sedimentation rates (Westergren)—synchronizing with anti-hyaluronidase titrations.

2. Routine urinalyses.

3. Biochemical studies consisted of A/G ratios and globulin fraction estimations on each patient at least once during the period of observation. A special attempt was made to include this data because of widespread interest in the subject at the present time.

The literature relating antibodies to globulin fractions, particularly gamma globulin, has been reviewed by Sabin in 1939 and increasingly strong evidence is accumulating to suggest that antibodies are indeed modified gamma globulins and are obtained from the cells of lymphoid tissue (Doherty *et al.*, 1944, Chase, 1943).

In 1936, Davis studied the plasma proteins in rheumatoid arthritis and noted that globulin fractions, mainly euglobulin, tends to rise in this disease whilst the albumin tends to fall. He also noted that fibrinogen content usually rises in rheumatoid arthritis but not in proportion to the globulin rise.

In 1939, Scull, Bach and Pemberton presented data to show that atrophic arthritics often present low albumin-globulin ratios. Total proteins and globulin fractionation were undertaken in this study because of the above observations, but since hypoproteinemia is known to occur as a result of nutritional deficiency (Bieler *et al.*, 1947), it was originally decided to include vitamin and nutrition studies as well.

More recently Swedin and Bengtsson (1944) confirmed the findings of Davis and of Scull *et al.* and presented

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1. With the co-operation of Dr. H. P. Wright.

2. With the co-operation of Drs. Alan Ross and Arnold Johnson.

evidence to suggest that with improvement in the disease the sedimentation rate and plasma proteins tended to return to normal, but there was no absolute parallelism between these two factors. Kagan (1943) considers hyperglobulinemia to exist when the serum globulin concentration is above 3 gm. per 100 c.c. or when the total protein concentration is above 8 gm.

The procedure for globulin fractionation employed was that recommended by Milne in 1947. This method is based on varying the concentration of sodium sulphate at constant temperature. Nitrogen determinations were carried out by means of the micro-Kjeldahl procedure as well as by the Nessler procedure and it was noted that the results by the two methods checked very well with each other. By this procedure globulins can be fractionated into the pseudo- and euglobulin partitions and according to Milne, results with this method are in good agreement with those obtained by electrophoretic determinations.

4. Bacteriological studies consisted of naso-pharyngeal cultures for hemolytic streptococci on each case.

5. Miscellaneous tests such as non-protein nitrogens liver function tests, serum uric acids, etc., were done on various cases according to special indications.

C. *Estimation of hyaluronidase inhibitory substances.*—A number of methods have been developed for the detection and measurement of hyaluronidase. These methods vary in simplicity and sensitivity and must be chosen according to the objectives of the study. The following methods have been developed and used by different investigators. (1) The spreading reaction in animal skin. (2) The measurement of the increase in reducing substances following the action of hyaluronidase on its substrate. (3) The viscosity-reducing method. (4) The turbidimetric method. (5) The mucin clot prevention test (M.C.P.T.).

1. The spreading reaction in animal skin was first noted by Hoffman and Duran-Reynals and McClean. The test depends upon the ability of hyaluronidase to increase the area of spread of a fixed quantity of solution injected into the skin of an experimental animal. The area of spread is outlined by the addition of India ink or a dye such as Evans' blue or a hemoglobin indicator, to the injection mass. The area of spread is then measured in 20 minutes according to the formula $\frac{\pi D d}{4}$ (Hechter,

1947) where D is the longest diameter and d the smallest diameter of the spread. The results can be expressed as a percentage increase in area as compared with the mean area in a group of controls. This method is not too accurate and Hechter (1947) has pointed to a number of variable mechanical factors that can influence the results of such a procedure. This method also necessitates the availability and maintenance of a group of experimental animals.

2. The chemical method whereby hyaluronidase activity is determined by measuring the increase in reducing substances as the substrate is hydrolyzed, is a complicated one. The exact mechanism of the enzyme action in splitting the glucosidic linkages of the hyaluronic acid has not been adequately worked out. Hahn (1947) has produced evidence that at least two enzymes are involved. Furthermore, pure hyaluronate of known

hexosamine and uronic acid content must be used. This method is too involved and has too many unknowns to be of practical value in a small investigative project.

3. The viscosity-reducing method has been widely employed by many investigators because of its simplicity and accuracy. In 1940, Madinaveitia and Quibell pointed out that the time taken by any sample of enzyme to reduce the viscosity of the substrate to a level half-way between its original level and that of the solvent is inversely proportional to the concentration of the enzyme. McLean and Hale in 1941 modified this method somewhat, using two Ostwald viscosimeters in a constant temperature bath, one containing the buffer-substrate mixture with active enzyme and the other containing the buffer-substrate mixture with inactive (heated) enzyme. By comparing the flow-times of each mixture and observing how long the active enzyme took to reduce the viscosity of its substrate to the half viscosity level, they were able to work out the strength of the original enzyme. They defined a viscosity-reducing unit (V.R.U.) as that concentration of enzyme which will reduce the viscosity of a standard substrate preparation to a level half-way between its original figure and that of the solvent employed in 20 minutes.

4. The turbidimetric method was originally developed by Seastone (1939 and 1943) and by Kass and Seastone (1946). The test is based on the observation of Meyer and Palmer (1936) that pure hyaluronate at pH 4.2 produces a turbidity with blood serum. The action of hyaluronidase on the substrate interferes with the production of the turbidity which can be measured in a Coleman spectrophotometer. The method is accurate to within 10% (Meyer, 1947) but requires a relatively pure hyaluronate as the substrate.

5. The mucin clot prevention test has been largely used and developed by McClean *et al.* (1943). This test depends upon the fact that native (crude) hyaluronic acid and serum protein form a typical "mucin clot" on the addition of acetic acid. Hyaluronidase from all known sources destroys this capacity of the protein-hyaluronic acid complex to form such a mucin or fibrous clot. McClean noted that the highest dilution of the enzyme sample under examination which will inhibit clot formation after incubation with a standard substrate mixture for a fixed time was proportional to the potency of the original sample. This test has the advantages of being simple to perform, requires very little apparatus, works only with crude hyaluronic acid, due to its high degree of polymerization. This can be prepared in any laboratory and is sensitive to low concentrations of hyaluronidase.

The mucin clot prevention test was thought to be the most practical method for this investigation. It depends, as mentioned above, upon the observation that native hyaluronic acid in acid solution precipitates with serum protein as a typical fibrous "mucin" clot. After incubating the substrate with hyaluronidase, the clot is diminished in size and may be completely inhibited, the precipitate changing to a flocculent type. Previous incubation of hyaluronidase with serum containing specific hyaluronidase inhibitors so neutralizes the enzyme that on further addition of the substrate, a typical mucin clot will once more form.

The reaction can be schematically demonstrated as follows:

	Hyaluronate	+	Serum Protein	+	Acid	Clot			
	Hyaluronidase	+	Hyaluronate	+	S.P.	+	Acid	No Clot	
H. Inhibitors	+	Hyaluronidase	+	Hyaluronate	+	S.P.	+	Acid	Clot

The test requires a supply of stable, crude hyaluronate and an adequate enzyme. Sterile horse serum and acetic acid are used as the protein fraction and acidifying agent respectively.

Various authors have raised objections to this test, chiefly on the basis of difficulties in standardization engendered by insufficient knowledge of the exact mechanism involved in the enzyme reaction. Subsequent to the start of this investigation, Quinn (1948) published an account of further attempts at standardizing this test. The method recommended by him is essentially similar to that arrived at in our preliminary investigations. Both are based on the principle of using a constant amount of enzyme while varying the amount of serum in the titrations.

After various trials the following technique was adopted:

1. Equipment and materials.

(a) All glassware must be specially cleaned and well rinsed with distilled water as for any serological work. (b) Accurately controlled refrigeration and water-bath incubation is essential. (c) Hyaluronate substrate was prepared as a crude extract from ground-up umbilical cords according to the method of McClean *et al.* (1943). The end product is a powdered potassium hyaluronate that should be stored in tightly stoppered or sealed vials. (d) Sterile, normal horse serum. (e) Enzyme was prepared by growing the hæmolytic streptococci in the blood broth medium recommended by Friou and Wenner in 1947 with potassium hyaluronate added. Lancefield Group A Hæmolytic Streptococcus Type 4 (H.44) kindly supplied by Dr. Charles A. Ragan Jr., of the Presbyterian Hospital, New York.

The medium was prepared as follows: Difco beef heart extract 0.3%; Neopeptone (Bacto.) 1.0%; NaCl 0.25%, KCl 0.02%, CaCl_2 0.01%. Potassium hyaluronate 50 mgm. per 100 c.c. of medium pH adjusted to 7.2. Autoclaved at 15 lb. for 15 min. Sterile defibrinated sheep's blood added to give 10% dilution.

Inoculum consisted of scrapings from blood agar slope growth of hæmolytic Strep. which had been incubated for 18 hours at 37° C.

The inoculated medium was incubated at 37° C. for 24 hours; then centrifuged 30 minutes at 3,000 r.p.m., the supernatant decanted and distributed to stoppered vials in 1.0 c.c. quantities. These vials were placed in the quick freezer and kept at minus 40° C. When kept frozen in this way the potency seems to remain constant for 3 months. This enzyme containing medium is referred to below as E.C.M.

(f) Acetic acid, 10%. (g) Sterile, fresh, triple-distilled water. (h) Phosphate buffer pH 6.6 made up as follows: M/15 Na_2HPO_4 , 37.5 c.c.; M/15 KH_2PO_4 , 62.5 c.c.

2. Standardization.

(a) Hyaluronate substrate is made up as follows: (i) 1 part aqueous hyaluronate solution (0.15 to 0.2%). (ii) 1 part 10% horse serum in saline. (iii) 2 parts phosphate buffer pH 6.6.

Every new batch of hyaluronate when made up as the serum substrate mixture was titrated to find the minimum concentration necessary for producing a good clot when 0.2 c.c. of 10% acetic acid was added to 1 c.c. of the serum substrate mixture dilution. The largest batch used showed a good clot with a minimum of 0.15% of the powdered potassium hyaluronate in distilled water

(see (i) above). The buffered serum-hyaluronate substrate will keep at refrigerator temperature for 3 to 4 weeks provided it is not contaminated.

(b) Enzyme containing medium is affected by a number of factors of which the following are the most important.

1. Time factor in growth of culture. Meyer *et al.* in 1941 found the concentration of enzyme in cultures of their group A hæmolytic streptococcus (H.44) to be optimum at about 16 hours of incubation. Friou and Wenner obtained a good concentration of enzyme after 24 hours incubation of their streptococci in a blood broth medium.

2. Influence of pH. This had been pointed out by Hale (*vide supra*) who believed that some of the anomalous behaviour of streptococcal hyaluronidase reported by Meyer *et al.* in 1941 was due to the fact that at pH 4.6 this enzyme is inactivated while at pH 7.0 it is relatively stable.

3. Concentration of salts (McClean and Hale 1941).

4. Temperature. Hyaluronidase has been shown to vary in stability at different temperatures. At 50° C. and above, destruction of the enzyme takes place rapidly (Robertson, Ropes and Bauer, 1940).

5. Addition of hyaluronate to growth medium. The addition of hyaluronate to the growth medium was shown by McClean in 1941 to increase greatly the yield of hyaluronidase. Rogers in 1945 noted that the production of hyaluronidase by streptococcus group A type 4 was almost exactly proportional to the concentration of crude hyaluronate added to the culture medium.

6. It should be noted that the period between the thawing out of the E.C.M. and the setting up of the tests or titrations must not exceed 2 hours. Several controlled experiments were run in order to observe the rate of deterioration of the enzyme at room temperature, at 37° C., and at refrigerator temperature. The difference between room temperature and refrigerator temperature was not great enough to justify keeping the E.C.M. in the refrigerator after thawing, but the time at room temperature has to be watched carefully because enzyme potency will decrease as much as 50% in 6 hours. At 37° C. even more rapid deterioration occurs. Every week the E.C.M. was titrated in order to find the smallest amount which would inhibit clot formation. After thawing at room temperature dilutions of E.C.M. were made between 1:500 and 1:6,000 using 500 increments and the tests run as described below. The end point was taken at the tube showing complete inhibition (neither clot nor threads).

3. Testing for hyaluronidase inhibitors in the blood serum of a patient.

1. 5.0 c.c. blood is taken from the patient by venipuncture, placed in a clean test tube and allowed to clot.

2. The clot is loosened with a wooden applicator and the tube spun in the centrifuge for 10 minutes.

3. The clear serum is then set up in doubling dilutions with sterile double distilled water from 1:50 to 1:12,800.

4. 0.25 c.c. of each serum dilution is placed in a clean test tube and laid aside for the time being.

5. A vial of frozen (-40° C.) E.C.M. is removed from the freezer and thawed at room temperature.

6. The maximal dilution of this E.C.M. that will just inhibit clot formation with serum-substrate in the presence of 10% acetic acid is determined as described above.

7. 10 c.c. of the maximal inhibiting dilution of the E.C.M. is prepared and 0.5 c.c. amounts of this dilution are added to each of the tubes containing 0.25 c.c. of the patient's serum dilutions.

8. The E.C.M., patient's serum mixture is allowed to stand at room temperature for 15 minutes and is then placed in an ice water bath.

9. Control tubes are added as follows: (a) Patient's serum control. To each series, a tube containing 0.25 c.c. of undiluted patient's serum is added. (b) Enzyme control. To each batch of tests a tube containing 0.5 c.c. of the E.C.M. dilution alone, is added.

10. To all tubes, including controls, 1 c.c. of serum-substrate mixture is added.

11. The tubes are shaken and are then placed in a constant temperature water-bath at 37° C. for 20 minutes.

12. The tubes are removed from the water-bath and placed in ice water in the refrigerator for 5 minutes to stop enzyme activity.

13. To each tube is added 0.2 c.c. of 10% acetic acid and all the tubes are gently shaken. The reading is taken immediately. Reading: Those tubes of the test series showing clot formation, contain hyaluronidase inhibitors in amounts sufficient to overcome the clot inhibitory action of the E.C.M.

II. OBSERVATIONS

A. *Control sera*.—It was not possible to obtain a steady supply of known negative animal serum and therefore a number of "normal" human volunteers were recruited for periodic testing. Table I shows the results obtained.

Those controls showing moderately high titres, Nos. 2, 4, and 9, gave no significant history to account for these findings except that each had had the usual upper respiratory infections and No. 4 had an acute pneumococcal pharyngitis just prior to the first test. Nasopharyngeal cultures on all three did not yield any hæmolytic streptococci. It is to be noted in the controls that the levels in any one case remained relatively constant over the entire period of observation.

In addition, individual random tests were done on 30 consecutive volunteer blood donors from the Blood Bank Clinic, 12 of these showed titres of 1:50 or less, and 10, titres of 1:100 or 1:200. Eight out of the 30 showed titres of 1:400 or more and an attempt was made to obtain clinical histories from these people. One could not be interviewed. Three did not have any unusual history; one, 47 years of age had a titre of 1:800; one, 33 years of age had a titre of 1:400; and the third, 46 years old, showed 1:400 titre. Four gave histories of either frequent or chronic upper respiratory infections, but no definite bacteriological evidence was available (see Table I).

B. *Studies on patients*.—All the adult patients were veterans of the 1914-18 or 1939-45 wars. There were 13 cases of rheumatoid arthritis in every stage of the disease, but all showed some activity of their pathological condition as determined by painful swollen joints or an elevated sedimentation rate. The diagnosis of rheumatoid arthritis was based on the criteria outlined by Cecil and de Gara in 1946. Twelve of these patients were males. There was one female.

In addition one male adult case of acute rheumatic fever was included in the study as well as four children with active rheumatic carditis. There was one adult female, who had suffered an acute streptococcal sore throat and continued to show positive throat cultures for this organism for 12 weeks afterwards. There was also one adult male with an arthritis of both knees and ankles in whom an infected maxillary antrum revealed hæmophilus influenzae organisms and one adult male with multiple pains and a marked psychoneurosis as

TABLE I.
HYALURONIDASE INHIBITORS
IN SERA OF CONTROL SUBJECTS

Controls						
No.	Name			Results		
1.	L.L.	Dec. 4 nil	Jan. 26 1:50	Feb. 26 1:50	Mar. 15 1:50	Mar. 29 1:50
2.	R.P.	Dec. 11 1:800	Jan. 29 1:800			
3.	J.L.	Dec. 30 1:50	Jan. 28 1:50	Mar. 18 1:50	Mar. 29 1:50	
4.	A.G.	Dec. 30 1:400	Feb. 3 1:400			
5.	J.D.	Jan. 7 nil	Feb. 9 nil	Feb. 19 nil	May 14 nil	
6.	J.C.	Jan. 7 1:100	Feb. 10 1:100	Apr. 13 1:100	May 25 1:100	
7.	S.W.	Jan. 8 1:100	Feb. 9 1:100	Apr. 2 1:200	June 10 1:100	
8.	R.S.	Jan. 8 1:100	Feb. 19 1:100	May 1 1:100	May 31 1:100	
9.	C.R.	Jan. 14 1:800	Feb. 10 1:800			
10.	C.L.	Jan. 16 1:200	Feb. 24 1:200	Apr. 23 1:200		
11.	P.G.	Jan. 21 1:50	Mar. 8 nil	May 7 nil		
12.	S.S.	Jan. 9 1:400	Mar. 2 1:200			

determined by the hospital consultant in psychiatry. However, on two occasions some definite swelling was noted on his left knee and two fingers of his right hand. Although these swellings were very transient and the sedimentation rate remained normal throughout the period of observation, a diagnosis of "psychogenic rheumatism" (Comroe, 1944) could not be made. This patient was eventually discharged as a case of polyarthritis of undetermined etiology.

The majority of the patients with rheumatoid arthritis were receiving weekly intra-muscular injections of gold salts during their period of observation, as well as iron and added vitamins. Some were given various amounts of oral sodium salicylate for pain. The average period of observation of each patient was about 15 weeks.

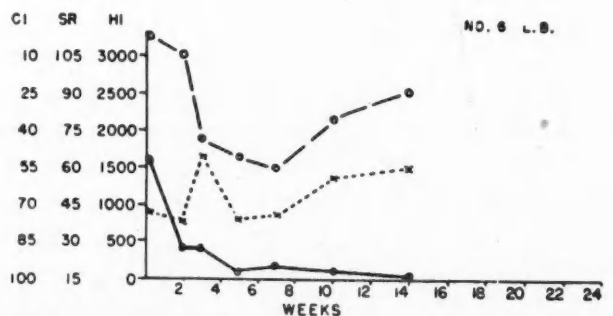
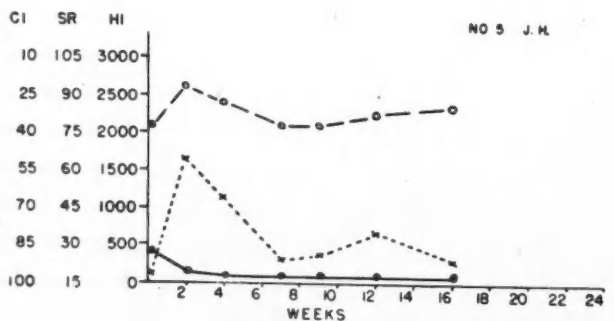
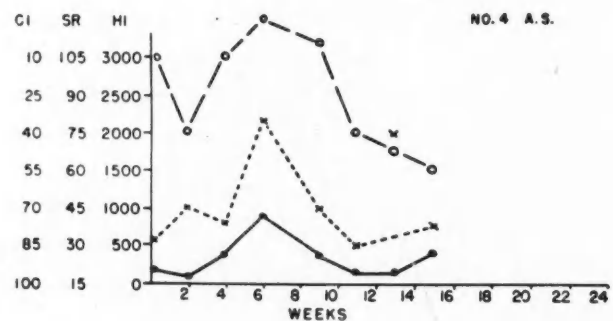
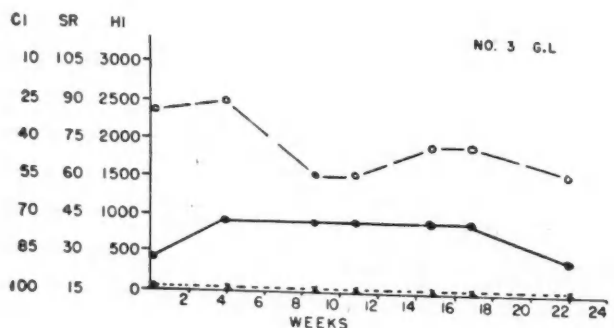
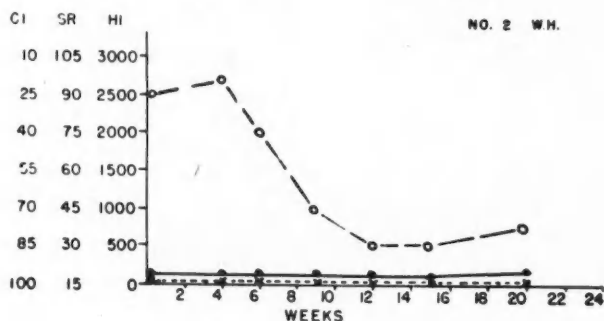
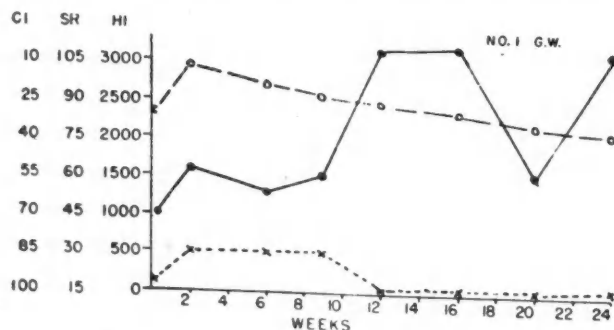
Comparisons between the anti-hyaluronidase levels, sedimentation rates and clinical findings have been made in these patients and in 20 of the 21 cases studied, these results have been plotted on graphs (see charts). The clinical indices (C.I.), hyaluronidase inhibitors (H.I.) and sedimentation rates (S.R.) are plotted as ordinates with the times of observation in weeks as abscissæ. Although no definite con-

clusions can be drawn, the following observations may be of interest.

1. *Rheumatoid arthritis cases.*—Seven of the 13 rheumatoid arthritics showed significant variations in their anti-hyaluronidase titres. Of these seven, 3 cases were found to have low titres at the start of observation but increased titres later.

CASE 1

G.W., this 38-year old male was admitted with an acute exacerbation of his arthritis which had responded to gold six months previously. The acute inflammation of his joints increased in the first two weeks with increased sedimentation rate. He was given a second course of gold but over a 24-week period, little improvement was noted. The hyaluronidase inhibitors increased during this period up to a serum dilution of 1:3,200 and remained high. In the acute phase he had a polymorphonuclear leucocytosis up to 17,400 which decreased with the sedimentation rate. His globulins were found



HYALURONIDASE INHIBITORS (H.I.) ●——●
 SEDIMENTATION RATE (S.R.) x-----x
 CLINICAL INDEX (C.I.) o———o

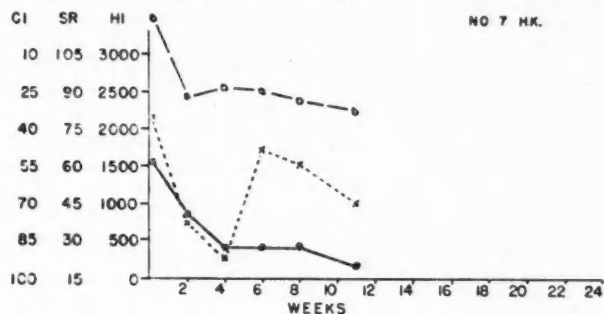
to be high in the period of high anti-hyaluronidase titre, the main increase being in pseudo-globulin with some euglobulin increase.

CASE 3

G.L., this 29-year old male was from the outset a problem in differential diagnosis, as his first attack of arthritis followed a non-specific urethritis. He was admitted with an acute polyarthritis following a second attack of urethritis. It was eventually decided that he was a case of rheumatoid arthritis despite a normal sedimentation rate in hospital. He was treated with gold and improved gradually. The anti-hyaluronidase titre increased to 1:800 in the acute phase and remained high, finally decreasing slightly.

CASE 4

A.S., this 42-year old male was improving on gold therapy when he suddenly developed an acute flare-up of

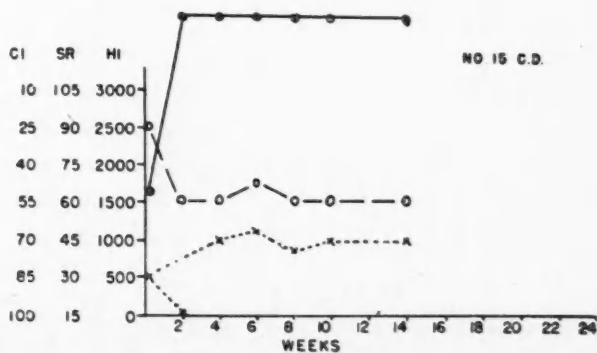
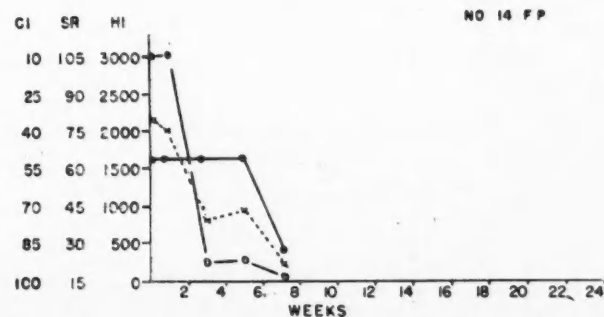
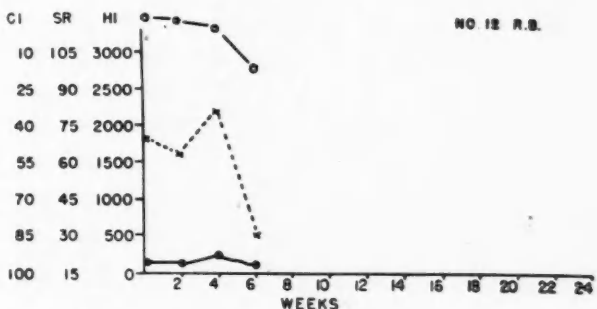
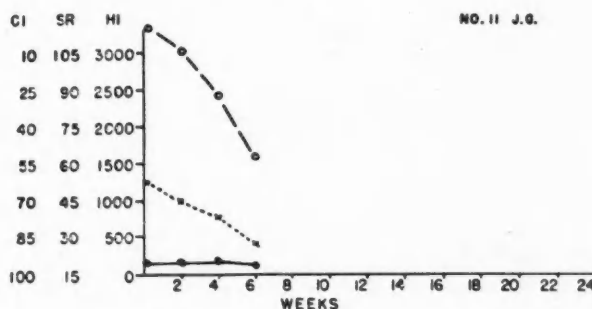
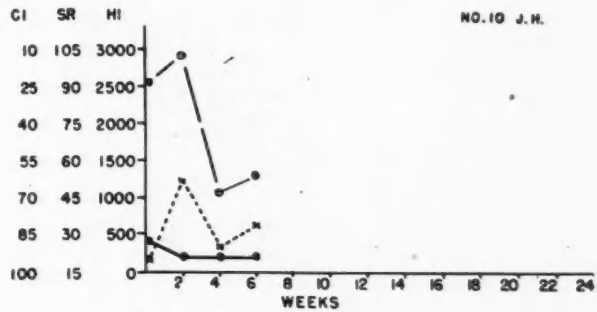
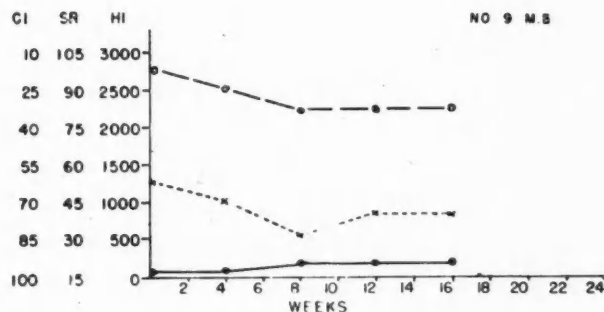
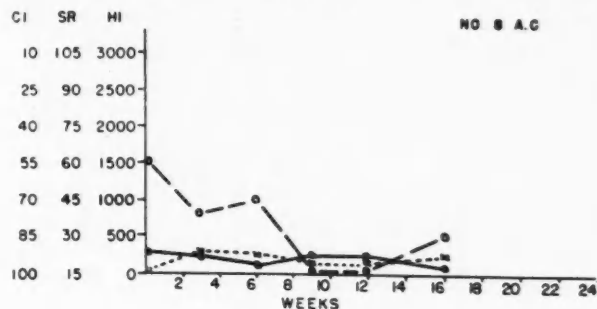


several joints. Gold was continued and he gradually improved. Anti-hyaluronidase levels to some extent, paralleled this clinical exacerbation, although the peak was only 1:800. Haematological findings were not remarkable. His euglobulin fraction was markedly increased to 3.5 gm. %.

In the other 4 cases of the seven showing significant anti-hyaluronidase titre variations, the highest titres were found at the beginning of the period of observation as follows:

CASE 6

L.B., this 23-year old man was admitted with his first attack of rheumatoid arthritis which at first resembled an acute rheumatic fever. Initially he improved on salicylates and bed rest, but later developed more



typical signs of rheumatoid arthritis. His hyaluronidase inhibitor titre started at 1:1,600 decreased rapidly and subsequently remained low. Increases in euglobulin were noted, but other observations were not remarkable.

The other 3 cases were similar in that they were well established rheumatoid arthritis cases admitted for treatment of acute flare-ups. Each case (Nos. 7, 10, and 5) showed an initial acute inflammation which subsided leaving basic levels of disability and the anti-hyaluronidase titres to a certain extent paralleled these clinical findings. In 2 cases (5 and 7) the euglobulin was markedly elevated while in one case (No. 10) it was only slightly so.

Of the other 6 cases of rheumatoid arthritis studied, 5 did not show any appreciable variation in their anti-hyaluronidase titres during the period of observation. The remaining case was exceptional in that the objective physical findings were so insignificant that description is difficult despite the fact that she showed a rise in anti-hyaluronidase titre from 1:50 to

1:400 over a 3-month period, followed by a recession to 1:200. This rise corresponded with increased physical activity.

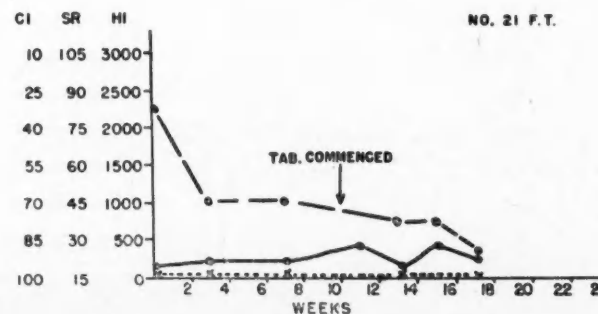
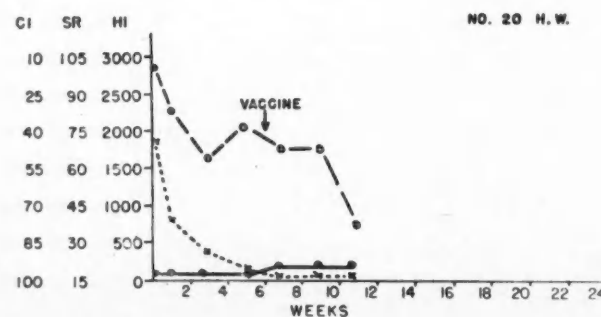
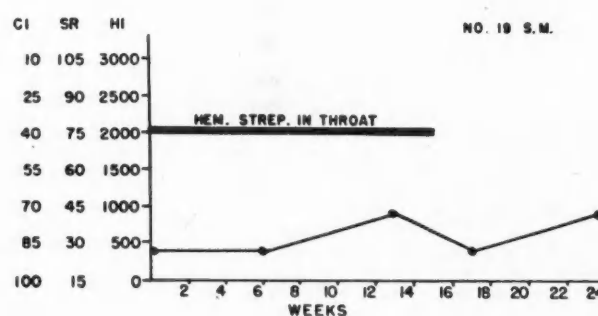
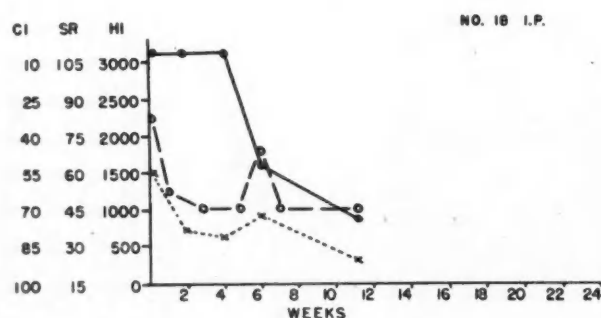
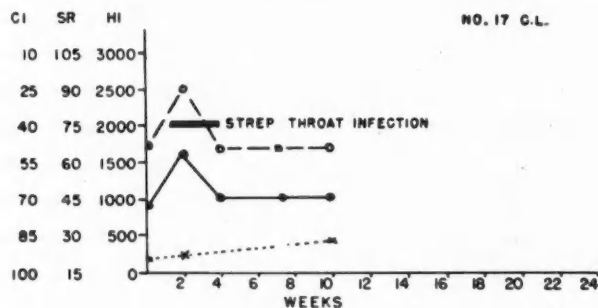
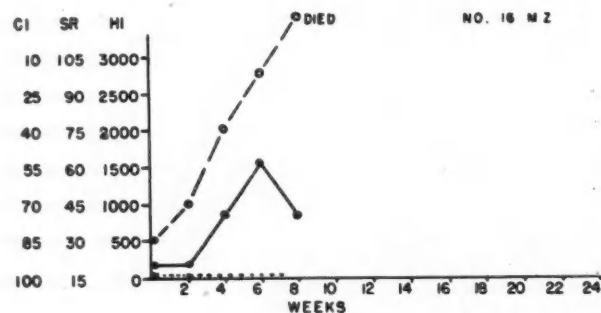
These 5 cases can be summarized by stating that all were well established cases of rheumatoid arthritis and four responded favourably to therapy while the 5th has been severely crippled for 2 years and has shown very little response to treatment.

CASE 2

W.H., this was a fairly acute case clinically with typical joint changes. Sedimentation rate, other haematological examinations and serum protein were all within normal limits. The anti-hyaluronidase titres were 1:100 except towards the end of the period of observation when the titre was 1:200.

CASE 11

J.G., this case was observed for 6 weeks only. He was an old case with a recent acute exacerbation which responded well to gold therapy. Haematological and biochemical examinations were essentially negative except for a very slightly elevated euglobulin fraction. The anti-hyaluronidase titre did not show any appreciable change except for a fall from 1:200 to 1:100 coincident with the fall in sedimentation rate and clinical improvement.



2. *Rheumatic fever cases.*—This group consisted of 5 cases of rheumatic fever. The first of these was an acute primary attack in a young male without any obvious cardiac manifestations. This man responded well to salicylates and bed rest. The pattern of curves is interesting. Clinical improvement, reduction in sedimentation rate and fall in antihyaluronidase titre from 1:1,600 to 1:400 are pretty well parallel. The other 4 cases of this group were children followed at the Montreal Children's Memorial Hospital through the courtesy of Drs. Alan Ross and Arnold Johnson.

CASE 18

I.P., the first case represented an exacerbation of rheumatic myocarditis and the findings pretty well paralleled those of the adult case just described, except for the level of anti-hyaluronidase found—starting at 1:3,200 and eventually dropping to 1:800 in 11 weeks.

CASE 15

C.D., this case was similar except that she had evidence of renal damage and chronic infected tonsils in addition to her myocarditis. In effect she did not respond to therapy after the first 2 weeks' improvement. The anti-hyaluronidase titre in this case was altogether different and continued at a high level of 1:6,400.

CASE 16

M.Z., the next case died in acute congestive failure after a steady down-hill course. The anti-hyaluronidase titre in this case rose to 1:1,600 from an initial level of 1:200.

CASE 17

C.L., this patient was quiescent on admission but developed an abrupt rise in anti-hyaluronidase titre corresponding with an acute throat infection from which hæmolytic streptococci were isolated. After sulfadiazine therapy, the streptococci disappeared and anti-hyaluronidase returned to its original level.

3. *Miscellaneous cases.*

CASE 19

S.M., this case can be compared with Case 17. An adult member of the hospital staff continued to carry hæmolytic streptococci in her throat for 15 weeks subsequent to an acute pharyngitis. Her titre did not go above 1:800.

III. DISCUSSION

In general, the methods for assessing the clinical state of the patients worked well in individual cases and gave very fair values when confined to comparisons between the individuals' improvements and regressions at different times. On the other hand the "clinical index" does not give very accurate comparisons as between different patients. Thus patient No. 1 showed more signs of active inflammation than did patient No. 2, although the clinical index in both had to be rated as 10 to 20% because of over-all disability, numbers of joints involved, etc.

The details of clinical and other findings in relation to the recording of high or low anti-hyaluronidase titres have been examined with care in all the cases studied to date. In the rheumatic fevers the inflammatory activity and anti-hyaluronidase titres tended to be directly proportional, but in the rheumatoid arthritis cases correlations remain obscure unless further study reveals a correlation between the anti-hyaluronidase titres and the degree of really active inflammation. Partly because of this suspicion it is hoped that continued studies may incorporate other data such as muscle biopsy findings.

Even though the series of "normal controls" reported is small, the results seem to suggest that there is a very much greater tendency for patients with rheumatic disease to show marked variations in anti-hyaluronidase titre when compared with these "normals". These findings on "controls" also tend to confirm those of Friou and Wenner (1947) and of Quinn (1948), namely that relatively high titres are not infrequently found in normal individuals and that the higher titres are more common in individuals of the older age groups.

The standardization of the mucin clot prevention test, while by no means ideal, gave reasonable satisfaction in the 6 months of operation reported herewith, and has continued to do so during the last 3 months. It is felt that this is reflected in the findings on the first group of "controls" reported where repeated tests over period of months yielded very uniform results. Variations in titre of one tube (in double dilutions) cannot be considered significant.

SUMMARY AND CONCLUSIONS

PART I.

1. A review of the literature offering evidence of correlation between the histopathological findings in various "rheumatic diseases" and the concept of "diffuse collagen disease" has been presented.

2. A general review of concepts of etiology in rheumatic disease has been presented with special emphasis placed on the rôle of hæmolytic streptococci and of hyaluronidase.

PART II.

1. Methods for studying anti-hyaluronidase titres in the sera of patients in relation to their clinical conditions have been described.

2. Observations on a series of 21 patients have been presented with some additional results on normal controls.

3. It is felt that sufficient variations have been found in the patients to justify further work along these lines.

The authors wish to express their thanks to Dr. H. P. Wright and Dr. George Streat for their co-operation in the collection of clinical and other material; to Dr. Charles Ragan and to Drs. J. J. Friou and H. A. Wenner for special strains of streptococci supplied by them; to Dr. Erwin Schwenk for purified hyaluronate (Schering); also for co-operation and assistance from A. H. Neufeld, Ph.D., chief biochemist of this hospital.

It is not possible to publish a complete list of the 184 references quoted in these two articles, but a list can be obtained in reprint form if requested from: Hugh Starkey, M.D., Director of Laboratory Services, Queen Mary Veterans' Hospital, Montreal, P.Q.

STREPTOMYCIN IN CHILDHOOD TUBERCULOSIS*

Gladys L. Boyd, M.D., F.R.C.P.[C.]

Toronto, Ont.

THE final evaluation of any therapeutic agent in tuberculosis cannot be presented at this time. It is only five years since the discovery of streptomycin, and less than two since it was available for treating tuberculosis to any but a few research groups. Reports at this time only concern more or less immediate results, not the end ones, which will not be possible for at least five years. Valuable lessons may, however be learned on the way. For that reason, we present the following observations made on 34 children treated with streptomycin at the Hospital for Sick Children, since January 1, 1947. The fact that the selection of cases was not always wise, and that the expected mortality rate of the groups was at least 80%, made a real death rate of 16% to date pretty conclusive evidence that the drug is of value. All the fatal cases were meningeal ones of such long standing that they would not be considered suitable cases, and three of them were treated for three days or less before death supervened.

* From the Hospital for Sick Children and the Department of Paediatrics, University of Toronto, under the direction of Alan Brown, M.D., F.R.C.P.(Lond.).

Read at the Seventy-ninth Annual Meeting of the Canadian Medical Association, Section of Paediatrics, Toronto, June 25, 1948.

The following is a list of the cases treated:

1. <i>Tuberculous meningitis.</i>	
(a) Fatal	6
(b) Living and ambulatory	3
(c) Still under treatment	5
2. <i>Pulmonary.</i>	
1. Miliary.	
(a) Cured	6
(b) Under treatment	2
2. Rapidly advancing pulmonary exudative types; 2 with cavities.	
(a) Cured	5
(b) Doing well; off drug	2
(c) Still under treatment	1
3. <i>Primary complex</i> —recovered but no better than expected without drugs	1
4. <i>Surgical.</i>	
(a) Pulmonary with tuberculous knee ...	1
(b) Miliary with tuberculous hip and large tuberculous abscess	1
5. <i>Scrofuloderma</i>	1

Seventeen of these children were under eighteen months of age, the youngest miliary case was three months old. They, with the exception of the patient with a primary complex, had an expected mortality of 100% but only one died. The latter was meningeal and only in hospital three days before death.

Streptomycin produces toxic symptoms of which the neurological ones are most severe. Tinnitus and vestibular disturbances are the commonest reported, but it is difficult to assess their occurrence in this young age group. Deafness and blindness both occur in the meningitis cases. It is now generally conceded that the latter is due to the disease, as early optic atrophy occurs in untreated cases and the drug keeps them alive long enough for it to develop fully. It completely clears up sometimes while treatment is still being given. Deafness is usually considered due to the drug. It has disappeared within a few months in all but one of our cases. This baby appeared totally deaf when streptomycin was stopped six months ago and can only lately hear the spoken voice. More acutely toxic symptoms during intrathecal therapy have been vomiting, neck rigidity, deepening unconsciousness and increased cells in the spinal fluid. They have responded to discontinuance of intrathecal drug for a few days and then proceeding with lower doses. They were most common when attempts were made to raise the dose to over 100,000 units.

In some meningeal cases it is difficult to determine if the symptoms are due to drug or to brain damage from the disease. These symptoms are spasticity, tremors or convulsive twitching, and shrill cries if disturbed. At times they are

so early in the disease that the drug appeared responsible. In others they occurred a month or more after therapy started, and could readily be explained by brain lesions, either vascular or necrotic. They are a bad prognostic sign. Hemiplegia, varying from weakness to paralysis, occurred for a variable time in all the meningitis patients. It was probably due to drug and cleared up shortly after its discontinuance.

None of the above symptoms occurred in the pulmonary cases. These presented no serious toxic symptoms. Transitory albuminuria or hæmaturia occurred but was of no serious significance. Occasional rashes were seen. Local hardness and some pain at the site of inoculation, and in one case a cold abscess due to a resistant staphylococcus were noted. The local reaction only once was sufficiently severe that therapy had to be discontinued. Eosinophilia was only noted once and then only 18%.

The size of the dose, the frequency of its administration and the duration of treatment are all difficult questions. The minimal effective dose has not, as yet, been determined. It is important, as some of the toxic aspects are directly proportional to the size of the dose. Earlier it was felt that as with other forms of chemotherapy definite blood and spinal fluid levels were essential. It is known that most tubercle bacilli, *in vitro*, are sensitive to less than 2 micrograms of streptomycin per c.c., but that they rapidly become less sensitive, and impossible blood levels would have to be maintained if their effectiveness depended on maintenance of a level higher than that of the sensitivity of the organism. In our series, there were wide individual fluctuations of both spinal fluid and blood levels. In the main, the spinal fluid concentrations were greater than 12 micrograms and less than 25, and those of the blood more than 38 and less than 96. Spinal fluid levels, without intrathecal drug, fell to more than 8 and less than 11. Higher dosage did not raise the level proportionately, possibly because the toxic effects prohibited its use long enough. Spinal fluid levels rose to 100 or over only in the two Pott's cases with bone grafts. Within these ranges, no difference in therapeutic results was noted in the higher concentrations. Frequent administrations are necessary to maintain these levels—at least every six hours intramuscularly and intrathecally daily. While

the drug is still considered mildly antibactericidal, its main effect is inhibitive and is made possible by alteration in the life cycle of the bacillus. Feldman, Hinshaw and Carlson¹ suggest that blood levels are not necessary and that sufficient adheres to the surface of the bacterial cells and adjacent tissues to exert a repressive effect long after detectable amounts have gone from the blood and spinal fluid. They state that the reproductive function of the organism may be sufficiently disrupted by a short daily contact, that the organism requires several days to regain its equilibrium, and during this time the morbid process is diminished. If such action is repeated often enough it is logical to assume that reparative factors gain the ascendancy. It is probably adequate, therefore, to give infrequent doses, once or twice a day, or even alternate days except in virulent cases. In the virulent cases we now give 1 gram a day intramuscularly every four hours at first, increasing the time interval to every 6 or 8 hours later. In the meningeal cases, 25,000 to 50,000 units are given intrathecally daily, and later every second day. Recently two new patients have been started on one gram a day, in two doses, and one other because of local reactions, once a day.

Treatment with streptomycin must be given for three to six months. Longer may be harmful, shorter may be inadequate and effective further treatment impossible once it has been stopped. The absence of clinical and radiological activity and repeated negative stomach washings or negative spinal fluid cultures and negative guinea pig tests are criteria for stopping. Further general sanatorium care will be needed for from six months to a year.

The changes produced in the tubercle bacillus by streptomycin are of clinical as well as scientific interest. Some strains are resistant to streptomycin and all of them rapidly lose their sensitivity. Determinations of the latter take too long to be of much clinical help. Three weeks is the least time in which this can be determined and complete study of material to determine the presence of more resistant strains takes twice as long. By this time the presence of resistant organisms will have been apparent by the failure to sterilize the spinal fluid. Further, the finding of a second more resistant strain does not preclude help being given if the sensitive strain is

inhibited, *e.g.*, one patient had a strain sensitive to 3 units per c.c., later study showed another strain resistant to 90 micrograms, yet the child has recovered completely. The universal loss of sensitivity the organism acquires during treatment makes it imperative that treatment be continued until the suppressed disease is conquered sufficiently that the patient may handle his own infection, as further treatment with streptomycin is useless after discontinuing the drug once. Further, the organisms pass this resistance on to their progeny so that infection from a treated individual is doubly dangerous.

In the guinea pig studies of the Mayo group, reversal of a positive tuberculin test to a negative was taken as good evidence of healing. We repeated Mantoux tests on all the children who had been treated two months or longer but found no change. Three of these had been off drug for over a year and clinically and radiologically were cured.

Every case of tuberculosis, even in young infants, does not need streptomycin. Many will respond equally well to ordinarily accepted methods and should not be subjected to the expense and pain of streptomycin. Its outstanding value is in the virulent cases that do not respond to ordinary treatment such as miliary, meningeal and rapidly advancing exudative lesions. Primary foci are unaffected. Infants and young children prone to develop widespread lesions should be watched closely for any untoward symptoms that the drug may be given early should they supervene. Good results have been reported in surgical cases. Our experience has been limited to two of these who had miliary tuberculosis as well. One was treated six months with complete regression of the pulmonary lesion and cessation of necrosis of a rapidly destructive lesion of the knee joint. The other, a hip case, is still under treatment. One case of scrofuloderma was treated for a few weeks with rapid improvement.

Early diagnosis of miliary and meningeal tuberculosis being now so vital, it is not superfluous to point out early diagnostic phenomena. Textbook descriptions are of late disease. Radiological evidence often appears three to four weeks later than symptoms. The most significant physical finding is a large spleen. The most common symptoms are high swinging fever, without obvious cause and not responding to the usual antibiotics. Weight loss is a

late sign, often only seen in the last few weeks of life in untreated cases. All miliary cases should be regarded as potential meningeal ones and lumbar punctures done. If in addition to the above symptoms anorexia or vomiting and irritability are present the diagnosis of meningitis is almost certain. Coma or even dulling of consciousness is not present early. The only signs at this time may be positive tache cerebrale and obvious pain when one attempts to do a Kernig.

The pathology of the treated case is valuable in indicating the effect of the drug on tuberculous lesions. In brief the following were the important findings in our fatal cases.

CASE 1

E.S., aged 2 months; 1 month disease; 3 days' treatment; no change.

CASE 2

E.B., aged 2 years; 2 months' disease; 3 days' treatment; no change in the lesions, but an interesting feature was a tubercle rupturing through the ependymal lining of the aqueduct of Sylvius causing a tuberculous ventriculitis. There was thickened arachnoid at the base of the brain and early hydrocephalus. There were no choroidal tubercles. Six tuberculomas were found.

CASE 3

J.L., headache, 5 months, acute symptoms 2 weeks. Duration of treatment, 61 days, 11 grams drug. There was optic atrophy and no choroidal tubercles. No Ghon lesions nor miliary tubercles in lung. Caseous lesion in left kidney. No meningeal tubercles, yellow white exudate at base of brain, no tubercles on surface. The pons showed increased fibrotic reaction, more lymphocytes and less caseation than expected. The cord showed tuberculous granulation tissue at the site of the puncture, (the latter had to be made high up dorsally because of an old Pott's disease with fusion below). The arteries of the cerebral cortex showed nodular thickening as is seen in periarthritis nodosa.

CASE 4

G.K., disease 16 days before treatment. Duration of treatment, 16 days, 120 grams drug. No typical tuberculous lesions found in lungs or peribronchial lymph nodes. The glands showed irregular areas of patchy fibrosis and their margins were crenated as if they had once been larger. There was increased fibrosis in the capsule of these glands. There was no caseation nor calcification. There were no miliary tubercles anywhere. There was minimal reaction over the surface of the brain. Under the ependymal lining of the ventricle there was marked destruction and softening of brain tissue, and thick exudate at the base of the brain. This looked like tuberculous granulomatous tissue but showed more fibroblastic proliferation on healing than is usually seen in tuberculous meningitis. There was evidence of retardation but not complete disappearance of tuberculous lesions of the brain.

These findings are comparable to those reported by Baggenstoss *et al.*³ who considered them to represent good evidence of the inhibitive effect of streptomycin. The fibrosis, lack of caseation and cell shrinkage suggest healing.

The regressive changes occurred so rapidly that the usual spherical lesions are irregular and angular (Case 4). Such changes were also seen in guinea pigs with apparent complete eradication of disease in 30%.⁴

The prognosis in the meningeal cases depends mainly on three factors, the duration of the disease before treatment, the location of the disease and an infecting organism sensitive to the drug. The picture presented by the early case has already been given. Other early disease might be discovered in post-measles cases, if tuberculous meningitis was always looked for when drowsiness and coma come on more than a week after the measles rash.

It has been abundantly proved that meningeal tubercles respond to streptomycin but those in the brain substance do not, probably because a pia glial barrier prevents the drug coming in contact with the lesion. There are certain clinical suggestions indicating whether the meningitis is part of a miliary spread or due to the rupture of a tuberculoma. The prognosis is better in the miliary cases. Choroidal tubercles are early eye signs and disappear rapidly under treatment; they and other choroido-retinal changes are more frequent in miliary cases. The brain cases often present a longer history of some intracranial disturbance, such as headaches for weeks prior to the onset of acute disease.

Spinal fluid protein is of more prognostic significance than cell counts. It has been highest in those fatal cases, undiagnosed until comatose and lowest in the early miliary cases. Rapid increases in cells during treatment are usually drug reactions. Both cell counts and protein were higher in the old spinal fusion cases, one of which was fatal and had a myelitis.

No case in this series was diagnosed tuberculous meningitis by smear alone. Positive cultures and guinea pigs were always obtained. Some tuberculous children show transitory cell increases without organisms, and these may be regarded as a form of serous meningitis occurring in the tuberculous and not a tuberculous invasion of the central nervous system.

There were 14 meningeal cases in this series, six died, five are still on drug, two of these doing well; and three survivals, one for a year since discontinuing drug, one for six months

and one for six weeks. The last of these is the most promising. She was comatose at the onset, but her disease was of short duration having been caused by measles one month before. The child is at present an essentially normal child. During her treatment she had optic atrophy and hemiplegia, but both have disappeared. The only residual sign is very slight strabismus, and her parents are uncertain whether it was not always present. The first child is well physically, having progressed from a complete wreck, blind, deaf, hemiplegic and spastic one year ago to being normal physically. Intellectually he is disappointing. In October last his I.Q. was 25; six months later it was the same although his physical improvement had been so great that clinically we expected it to be up. He is home at present, plays in the play pen and with toys, tries to talk and has stopped his meaningless screams. He is over three and acts like a fourteen months' old infant. The third child was totally deaf when therapy stopped, now at six months he hears the ordinary spoken voice. His hemiplegia has improved but is still present. Mentally he is still improving slowly but is nowhere near normal. This is doubly disappointing as during treatment he never seemed very dull mentally, although he did have some hydrocephalus. Three of those still receiving drug but nearly ready to stop, appear well with no neurological manifestations. One of the others has not become culturally negative after four months' treatment, has severe hydrocephalus but is mentally clear. He would seem a logical case to have a neurosurgeon treat and possibly remove a block, as Debré⁵ in Paris does. The other is blind, mildly hydrocephalic and spastic. Both these children are showing considerable improvement in the past two weeks so the outcome is still problematical.

There has been less evidence of cerebral irritation in the cases treated during the past six months with lower dosage intrathecally, 25 to 50 units as opposed to 100 to 200 milligrams earlier. The dosage at present used is 1 gram a day intramuscularly and 25,000 to 100,000 units intrathecally daily at first, and later every second day. Intrathecal drug is given until the spinal fluid becomes sterile and the cell count less than 20. Intramuscular drug is given for a longer time usually depending on the pulmonary condition.

The pulmonary cases have all done well. They were mostly babies with either miliary tuberculosis or rapidly advancing exudative lesions uncontrolled by ordinary treatment. All were repeatedly sputum positive. The sputum was obtained by stomach washings on two consecutive days. It is to be remembered that the lesion is not completely healed, despite the rapid disappearance of some miliary lesions. The process is repressed by the inhibitory effect of the drug on the organism. Further sanatorium care for six months to a year is needed to complete healing. Some even become sputum positive again after stopping the drug but sufficient time has been given that the body force can adequately deal with it. Drug has been given three to six months depending on progress. Three negative sputums, absence of fever, normal sedimentation rate, absence of splenomegaly, radiological evidence of regression are necessary before stopping as further treatment cannot be given after stopping. No case has regressed. The youngest miliary case was three months old. X-rays last week, one year after treatment, showed a normal radiogram. Four other babies with miliary disease are cured clinically and radiologically and discharged home. They required approximately one year of ordinary care after stopping drug to complete the cure. In two of these there is now no radiological evidence of disease, in one slight mediastinal enlargement is still present, in the fourth the miliary changes are gone but the apical lesion has healed by calcification. Those treated in the first six months of 1947 received a gram a day in eight equal doses, and since then, the same amount, in first six, and later three doses a day. At present two receive only two doses a day, and one, because of local reaction, only one. It is still felt that virulent cases should have multiple doses, at least at the beginning of treatment.

SUMMARY

1. Streptomycin therapy in virulent forms of childhood tuberculosis has materially reduced its mortality.
2. The drug has permitted cure of all pulmonary cases treated so far.
3. There is evidence to support the claim that it cures tuberculous meningitis. Better selection of cases of this disease to be treated will result in better end results.

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RÉSUMÉ

Rapport préliminaire concernant les résultats de la streptomycinothérapie chez des enfants atteints de diverses formes de tuberculose. Le groupe comprend seize enfants de moins de dix-huit mois, pour chacun desquels, sans la streptomycine, le pronostic eût été fatal à coup sûr; parmi ceux-ci, un seul décès. L'auteur rappelle les manifestations toxiques, particulièrement celles qui touchent la huitième paire crânienne. Dans les cas méningés, on rencontre des rigidités, des clonus, des convulsions, voire parfois une hémiplegie dont il est difficile de dire si le traitement en est la cause plutôt que la maladie. Ces manifestations tendent à suivre l'injection intra-rachidienne de doses supérieures à 100,000 unités. Par contre, on ne les a pas notées dans le traitement des formes pulmonaires. Ici, quelques éruptions, une hématurie transitoires, des indurations au lieu d'injection constituent la totalité des signes toxiques et ne contre-indiquent pas la poursuite du traitement. De la présente série, tous les cas pulmonaires sont guéris; un seul de ceux-ci, représentant la forme dite primaire ou de primo-infection, n'a pas été modifié dans son évolution. Quelques cas de tuberculose ostéo-auriculaire ont également profité du traitement. Quant aux cas de méningite tuberculeuse, le bilan du traitement par la streptomycine comprend 6 décès, 5 survies ambulatoires et 5 malades encore sous traitement, mais dont l'évolution a été nettement prolongée par la streptomycine. Parmi les enfants qui survivent, deux paraissent accuser un grave retard intellectuel; 5 font l'objet d'un pronostic favorable quant à l'intégrité neurologique et mentale. Les doses intra-musculaires initiales ont été de 6 grammes par jour dans certains cas, jointes à des doses intra-rachidiennes quotidiennes de 25,000 à 50,000 unités.

PAUL DE BELLEFEUILLE

PENICILLIN TREATMENT IN EARLY SYPHILIS*

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SINCE the report of Mahoney *et al.*¹ in 1943, on "The Penicillin Treatment of Early Syphilis",¹ there has been little doubt in the minds of most syphilologists that a new agent of real value has been added to their armamentarium.^{2, 14 to 21} Five years later its acceptance as a valuable therapeutic agent in the treatment of syphilis has been established. The problem remaining is the determination of the treatment schedule which uniformly and safely produces the optimum results, and which at the same time is economically sound.

Numerous schedules of treatment have been advocated^{2, 5 to 10, 22} and their various merits ex-

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tolled. The total dose of penicillin administered has ranged from 300,000 to 24,000,000 units. Penicillin has been given as interrupted intramuscular injections in either distilled water or normal saline, continuous intramuscular, continuous intravenous, etc. Certain other vehicles, *e.g.*, peanut oil, have also been used in an effort to delay absorption and thus prolong the effect of this antibiotic, as in the use of penicillin-oil-beeswax mixtures,^{11, 12, 13} or in combination with procaine.²³ The total time over which treatment has been given has varied from 24 hours to 3 weeks or longer.

Moore² states that although doubling the dosage results in progressively fewer failures, the failure rate is not directly proportional to the increased penicillin dosage. He reports that using commercial penicillin alone, administered on a q.3 h. intramuscular basis, over a time period of 7½ days, employing a total dose of 2,400,000 units, probably the limit of success has been reached and that further increases in total dose will not produce significant improvement in the "cure" rate. The relapse rate on such a schedule is approximately 15%.

In the fall of 1945, following the suggestion of McDermott,³ a group of patients with early syphilis was started on a schedule of treatment requiring the administration of amorphous penicillin 30,000 units intramuscularly q.2 h. for 90 doses (7½ days). A search of available literature up to this time had failed to disclose any series of patients similarly treated.

This series consisted of 51 cases, 23 males and 28 females; 50 being Caucasian and 1 Negro. The patients ranged in age from 16 to 60 years. All patients were observed for at least 12 months following termination of penicillin treatment and in most cases observation extended to 18 months or longer. Physical examination and serologic tests for syphilis were done just prior to penicillin treatment, at the conclusion of treatment, 1 month later, and q. 3 months for 1 year, and q. 6 months for 2 years. Cerebrospinal fluid examination was done immediately after treatment, and at 6 months, 12 months and 18 months. Twenty-three cases had darkfield positive chancres while 28 cases presented dermatological lesions, and 1 female had an associated acute syphilitic meningitis. Five cases were sero-negative while 46 were sero-

positive. Standard Kahn, Kolmer Wassermann and quantitative Kahn tests were done by the Ontario Provincial Laboratory on all sera and the initial serologic titre varied from 520 Kahn units to 4 Kahn units.

Twenty-two cases (43%) developed Herxheimer reactions (temperature over 101° F. [R.]), rectal temperature being checked q.2 h. x 12. Approximately 60% of the Herxheimer reactions occurred in darkfield positive chancres and the remainder were dermatological cases.

RESULTS

No serologic, clinical or neurological relapses were observed. There were 2 "treatment failures", from a serologic viewpoint, one with a serologic titre of 4 Kahn units, the other with a doubtful serologic test 1 year after treatment. There were no clinical failures in this series. This is a treatment failure rate of 4% in contrast to the expected 10 to 15% by proved arsenical and bismuth treatment schedules. According to the standards set up by the Penicillin Panel of the Office of Scientific Research and Development, U.S., (O.S.R.D.), neither of the above "treatment failures" would be considered as such, as this group accepts a treatment failure only if the serologic test for syphilis is in excess of 4 Kahn units at the end of 1 year post-penicillin therapy.*

DISCUSSION

The very low treatment failure rate in our series is at variance with the majority of series published to date, but it is necessary to consider our variance in technique from that employed in these latter series. In the first place, a 2-hour interval between doses, rather than the usual 3-hour interval, was employed, and secondly a dose of 30,000 units was given in contrast to the average 40,000 unit dose. Finally, amorphous penicillin (Connaught Laboratory) was used

* Previous to the commencement of our 30,000 unit q.2 h. x 90 penicillin schedule, a small series of comparable cases of early syphilis received 40,000 units q.3 h. x 60, using amorphous penicillin. Eight of these cases have been followed and at the end of 1 year post-penicillin treatment, we find 2 "treatment failures", 1 showing a group No. 1 cerebrospinal fluid (40 lymphocytes per c.mm. of spinal fluid), and the other a 20 Kahn unit serologic test for syphilis. It is noteworthy that this small series differs only in therapeutic routine, 40,000 units q.3 h. rather than 30,000 units q.2 h., a difference in total dosage of 300,000 units of penicillin, yet the treatment failure rate is more than 6 times that observed in the q.2 h. series. We appreciate that a series of 8 cases does not allow accurate biometrical evaluation.

throughout the series as compared to crystalline penicillin.

The q.2 h. schedule was adopted in an effort to maintain a higher serum level of penicillin throughout the period of treatment than was possible with the usual q.3 h or q.4 h. schedule. By this means it was hoped that the small group of patients in whom, for one reason or another, it is difficult to obtain effective blood levels of penicillin might be more adequately treated.

Since our schedule was begun, Eagle *et al.*⁴ have shown that "if the total number of injections was held constant, the curative dose was a direct factor of the interval between injections". In this article,⁴ the lethal blood level of penicillin *in vivo* (rabbits) for the *Treponema pallidum* (Reiter) was shown to be 0.05 units per c.c. and this is consistently exceeded by 30,000 units, q.2 h. intramuscularly, the schedule used in our series. Eagle has also shown that doses below this level, or intervals between doses greater than 2 hours, fail utterly in maintaining a spirochæticidal penicillin blood level. Probably these two factors contribute significantly to the decrease in treatment failures in our series. Finally, the amorphous penicillin used was a crude unfractionated product, differing from the relatively refined penicillin used predominantly in the series reported by American authors and we understand has proved, unit for unit, more therapeutically effective than this latter preparation.

The authors feel that the q.2 h. routine is a practical as well as a more therapeutically effective procedure than the q.3 h. routines. No technical or medical contraindications were observed. The patient suffers little pain when normal saline is used as a vehicle for the penicillin (less painful than when dissolved in distilled water). The patient seldom fully awakens during night doses. No somniferent sedatives were required. The gluteal injections were found to be less painful than the deltoid injections. Nurses have administered the treatment in this series and no abscesses or traumatic neuritis occurred. In no instance was it found necessary to discontinue treatment due to Herxheimer reactions and only one case required readmission to hospital for a post-penicillin allergic reaction (urticaria).

We would confirm that penicillin treatment is fast proving an ideal treatment for early syphilis. It isolates the infectious patient from

society by hospitalization and appears to offer a cure rate at least as good as other forms of anti-syphilitic treatment. The short period of treatment encourages better co-operation between doctor and patient and reduces the stigma attached to treatment systems requiring long attendance at out-patient clinics. There are practically no serious complications in this new treatment as compared to the older arsenical and bismuth routine. The cost of the penicillin is no greater than the cost of arsenicals and bismuth in the approved arsenical and bismuth routines and there is obviously a great saving in dispensing with the 6 to 9 month out-patient clinical care.

CONCLUSIONS

1. Fifty-one cases of early syphilis with darkfield positive or dermatological lesions have been treated with amorphous penicillin 30,000 units q.2 h. intramuscularly x 90 (2,700,000 units during 7½ days). This appears to offer an efficient means of treatment in early syphilis. The treatment failure rate on this schedule is significantly below that reported for other penicillin schedules.

2. The unusually low treatment failure rate (4%) and lack of a single serologic or clinical relapse might be attributed to the 30,000 unit dose, the 2 hour, rather than 3 hour, interval between doses, and possibly the use of (amorphous) unfractionated penicillin.

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RÉSUMÉ

Cet article fait part d'une méthode relativement efficace de pénicillinothérapie intensive de la syphilis. Cette méthode comporte 90 injections intra-musculaires de 30,000 unités de pénicilline amorphe, données aux deux heures, ce qui représente 2,700,000 unités en 7 jours et demi. Parmi les 51 malades, dont tous présentaient soit des examens sur fond noir positifs, soit des lésions cutanées, on n'enregistre que 4 p. 100 d'insuccès, chiffre nettement inférieur à ceux qu'a permis d'obtenir jusqu'ici la pénicilline. La méthode a, par ailleurs, l'avantage de la rapidité du traitement et de l'isolement du malade durant la période contagieuse.

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SALMONELLA NEWPORT MENINGITIS

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IN a review of the literature Neter¹ listed 79 cases of meningitis due to *Salmonella* organisms. None of these were due to *S. Newport*. Further reports of *Salmonella* meningitis² to 12 although listing other members of Group C, also make no mention of *S. Newport* as being the causative organism.

Edwards¹³ among 312 cultures of this organism from human sources, isolated one from the spinal fluid. No mention was made of the outcome of this case. Seligman¹⁴ in his series of 21 cases of *Salmonella* meningitis isolated 14 types, only one of which was *S. Newport*. This was in a 2 month old infant who died.

Neither Edwards nor Seligman were aware of any published cases of *S. Newport* meningitis. A search through the *Index Medicus* also reveals no such reports. On account of its apparent rarity, the following case is therefore described.

A male breast fed infant was operated on at age 7 weeks for a strangulated right inguinal hernia. His postoperative course was uneventful except for his having 2 or 3 loose mucoid stools daily while in hospital. On his return home, the number of stools increased slightly. The child was continued on the breast but required supplemental feeding. His general condition and weight increment were satisfactory, despite the loose stools, for 3½ weeks after his operation. At this time a sudden high fever and distension developed. He was re-admitted to hospital October 22, 1947. No apparent reason was discovered for this turn of events.

The child was put on skimmed lactic acid milk, penicillin and sulfasuxadine, by a colleague. Within one week the temperature dropped by lysis from 104° F. to normal. The stools were almost of normal consistency and the general health was good. The child was about to be discharged 3 days after the penicillin and sulfasuxadine had been discontinued. A stool culture taken October 24 showed only *B. coli* and *B. aerogenes* predominating.

On November 2, the temperature suddenly rose again to 103°. Physical examination revealed nothing abnormal. The child did not appear acutely ill. However, because of the unexplained fever, a blood culture

was ordered and penicillin 25,000 units q.4 h. was again started. Three days later because of persistence of fever, sulfadiazine gr. 1 per lb. body weight daily, was begun.

On November 6, the blood culture came back positive for some variety of *Salmonella*. The child on this day seemed to be somewhat "lifeless" in appearance but examination revealed nothing abnormal. Agglutinations against T.A.B. and abortus were negative. The sulfadiazine dosage was doubled and sulfasuxadine also was added. X-ray of the chest at this time was negative and urinalysis was essentially normal (no culture was taken).

Later in the same day, the child suffered a generalized convulsion. Examination showed him to be slightly toxic. There was also a questionable fullness of the anterior fontanelle which had been observed on November 3 for a very short time. Otherwise, no abnormalities were noted. Lumbar puncture revealed the cerebrospinal fluid to contain 5 mgm. % sugar, 2,500 polymorphonuclears, 250 endothelials, 100 lymphocytes and numerous Gram-negative motile bacilli. These proved to be the same organisms as were isolated from the blood stream. Stool culture this time also showed the same bacillus. This was ultimately identified by the Provincial Laboratories, as *Salmonella Newport*.

Penicillin was discontinued and the child was placed on streptomycin 35,500 units intrathecally once daily and 0.25 gram (250,000 units) intramuscularly daily in 8 equally spaced doses. The next day the cerebrospinal fluid was sterile although the cell count had increased. On November 8, the cerebrospinal fluid showed 20 colonies on culture. Streptomycin intramuscularly was doubled in dosage. This was continued until November 12 when the temperature returned to normal. However, that evening the child developed a right-sided convulsion. The streptomycin was therefore increased to 50,000 intrathecally and 100,000 units q.3 h. intramuscularly. The possibility of brain abscess formation was entertained but physical examination showed nothing remarkable. The next day another right-sided convulsion occurred and the temperature rose to 101°.

The following day, the child's previously slightly toxic appearance had improved. No further convulsions occurred. It was thought that the intrathecal streptomycin might possibly have been irritating¹⁵ and might have accounted for the convulsions. In view of the repeated negative cultures from the cerebrospinal fluid it was felt that the streptomycin might safely be discontinued intrathecally. This was done November 14, at which time the sulfonamides were also stopped. On November 17 the streptomycin was stopped completely. Uninterrupted progress continued until November 22 when the child was discharged as apparently cured.

Stool cultures obtained from the patient and the parents about one month later, showed no *Salmonella* organisms. Agglutinations against a stock strain of *S. Newport* as well as against the organism isolated from the patient, were done using the child's serum and the parents' sera. The patient showed a titre of 1:100 using one of his own cultures and 1:200 using another of his own cultures. The titre with the stock strain was also 1:200. The mother's serum contained no agglutinins. The father's serum showed no agglutinins against the baby's organisms but showed a titre of 1:25 against the stock strain.

Physical examination after an interval of six months revealed a perfectly normal child.

DISCUSSION

Salmonella organisms are widely distributed. Felsenfeld¹⁶ states that frequently *Salmonella* is primarily transferred by human carriers who may or may not have had clinical symptoms. Animal hosts, which are presumably possible sources of infection, are also important. The

organisms have been isolated from hog meat, fowl, eggs, rodents, flies, foxes, dogs, cats and even snakes. In addition polluted water, fish smokeries, contaminated cream pastries, ice cream, pies and mayonnaise are mentioned.

The source of our patient's infection is unknown. On account of the patient's age and feeding habits the greatest possibility is a human carrier. Although stool cultures from the parents were negative, these were taken long after the acute illness and were done only once. The negative results may therefore mean nothing. The possibility of the carrier being flies, a cat or a dog (which latter were transient visitors in the baby's household) were not excluded.

Neter¹ suggests that "S. bacteræmia and meningitis develop in persons with diminished resistance, particularly after other infections". Although this infant did not have any other apparent infection, his previous operation could conceivably have produced some local diminished resistance, which would allow more ready invasion of the blood stream. One cannot but help wonder whether the diarrhœa which followed the herniotomy may not have been due to the same organism which caused the bacteræmia and meningitis. The one stool culture taken October 24, was negative, but this does not necessarily exclude *Salmonella* enteritis. A prolonged interval between the onset of the diarrhœa and the occurrence of the more severe clinical manifestations is not unknown. Gaertner bacillus enteritis has been reported as persisting for 2 weeks before meningitis developed.¹⁷

It is intriguing also to consider the part riboflavin deficiency might play in the etiology. Kligler *et al.*¹⁸ showed that mice on a riboflavin deficient diet were much more susceptible to *Salmonella* infections than were the controls.

Roderuck *et al.*¹⁹ state that there is evidence suggesting that riboflavin is required in greater amount during tissue regeneration and increased metabolic activity. Their own investigation reveals that there is a "definite relationship between the amount of riboflavin in the diet and the amount secreted in the milk" of lactating mothers. Tissue regeneration was going on to some degree in our patient. The gastro-enteritis, being an infection, probably produced greater metabolic activity. The mother's diet was not checked. It would ap-

pear that riboflavin deficiency in our patient may have been present but, of course, no proof of this is available.

Felsenfeld¹⁶ points out the view held by many that persons contracting *Salmonella* infections react differently according to age, general health and strain of organisms, meningitis and sepsis being more frequent in infants and young animals. Reference to Table I presenting a number of cases of *Salmonella* meningitis would tend to confirm this. Certainly infection with *Salmonella* is common in young humans since 40% of 2,000 cases occurred in children under 10 years of age. Infants alone were responsible for 17% of the cases.²⁰

With regard to *S. Newport*, of 60 *Salmonella* types isolated from human sources in the United States this organism comes second only to *S. Typhimurium* in its occurrence. It has been responsible for almost 10% of cases of human infection.²⁰ Despite this, its predilection for the meninges is apparently minimal.

Treatment of *Salmonella* meningitis has not been satisfactory. Hollis and Barron² report 9 recoveries in a collection of 53 cases. Of these 9 cases, various sulfonamides were used in 5. They point out that of 7 cases treated with sulfonamides 5 survived, 4 with complete recovery. Of 46 cases not so treated 4 survived. Since Hollis' paper 4 more recoveries have been reported with the use of sulfonamides, chiefly sulfadiazine. Three cases have died despite this therapy. Other cases reported in the available literature have died (Table I). Up to the time of their report, Wood *et al.*⁷ had found no better method of treatment.

However, recently streptomycin has been regarded as the drug of choice in meningitis due to Gram-negative bacilli.^{21, 22} Two cases of *Salmonella* meningitis are mentioned.²² One of these recovered and the other developed hydrocephalus and died. Five cases of *Salmonella* bacteræmia with 3 recoveries are also quoted. Another case of *Salmonella* meningitis (*cholerae suis* Kunzendorf) was treated with streptomycin unsuccessfully by Barnes.¹¹ She was hampered however, by the limited amount of the drug available to her.

Dosage as suggested by Paine and Finland²⁴ viz.: 30 to 75 mgm. per lb. daily intramuscularly, 25 mgm. for newborns and 50 mgm. for infants intrathecally daily, was originally used in our

TABLE I.
SALMONELLA MENINGITIS.
CASES NOT REFERRED TO BY NETER.

Author and reference	Salmonella	Age	Sex	Treatment	Result
Lyon, G. M. and Folsom, T. G.: <i>West Virg. Med. J.</i> , 37: 249, 1943.	supestifer (cholera suis)	2 yrs.	..	Sulfanilamide	Recovered
Hollis, C. H. and Barron, E. W.: <i>J. Ped.</i> , 24: 568, 1944.	oranienburg	5 wks.	M	Sulfathiazole	Died: Hydrocephalus
L Cid, R. and M. Gonzalez, R.: <i>Rev. Chilena de Pediat.</i> , 15: 660, 1944.	paratyphi
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O'Callaghan, W. P.: <i>Irish J. Med. Sc.</i> , 232: 123, 1945.	typhimurium	1 month	..	"Sulfonamide" and Meningococcus antitoxin	Died
Wood, W. H. et al.: <i>J. Am. M. Ass.</i> , 128: 868, 1945.	panama	21 days	..	Sulfadiazine	Died: Hydrocephalus
Beattie, C. P. et al.: <i>Month. Bull. Min. Health and Emerg. Pub. Health Lab. Serv.</i> , 5: 184, 1946.	paratyphi	23 days	..	Sulfadiazine	Recovered
Vizcarrando, E. et al.: <i>Year book of Ped.</i> , p. 158, 1946.	typhimurium	35 yrs.	M	Penicillin (before culture obtained)	Died
High, R. H. and Spaulding, E. H.: <i>Am. J. Dis. Child.</i> , 12: 181, 1946.	panama	6 mos.	..	Sulfapyridine and Sulfadiazine	Recovered
Leeder, F. S.: Quoted by High and Spaulding above.	panama	2 1/2 mos.	M	Sulfadiazine	Recovered: blindness, paralysis, mental retardation, hydrocephalus
Seligman, E. et al.: <i>Ibid.</i>	panama	10 cases	..	.....	Died
Barnes, M.: <i>Bull. Charlotte Mem. Hosp.</i> , 2: 44, 1946.	cholera suis (Kunzendorf)	1 case	..	.....	1 died
Committee on Chemotherapeutic and other agents, <i>J. Am. M. Ass.</i> , 132: 4, 1946.	.....	1 case	..	Sulfadiazine	1 recovered
Edwards, P. R.: Personal communication.	Newport	2 wks.	F	Sulfamerazine	Died
Seligman, E.: Personal communication.	Newport	.....	..	Penicillin	.....
		2 1/2 mos.	..	Streptomycin	1 died
			..	Streptomycin	1 recovered
			..	.....	Died
			..	.....	Died

case. This was increased when positive cultures recurred, in order to avoid the possible development of streptomycin resistance in the organism with consequent failure of therapy.²⁵

When it is possible to test for susceptibility of the organism to streptomycin, it has been suggested that blood levels be maintained at 4 to 8 times that necessary to completely inhibit their growth *in vitro*.²³ No such check was made in our case. It will be noted that our case was treated with sulfadiazine and sulfasuxidine as well as streptomycin. *In vitro* studies²⁶ on other *Salmonellas* imply that even the low cerebrospinal fluid concentrations (1.5 to 1.8 mgm. %) of sulfadiazine which we obtained may not have been without real value. This however is impossible to evaluate. Cure might have been totally due to streptomycin, the sulfonamides or both.

The number of reported cases of *Salmonella* meningitis treated with streptomycin is still small. It is too early to judge just how efficient this treatment will prove to be. One cannot be sure as yet that the treatment of

choice might not be a combination of streptomycin and sulfadiazine.

SUMMARY

1. The first reported case of *Salmonella Newport* meningitis is presented. This occurred in an infant less than 3 months of age.
2. Some possible factors involved in the production of the disease are discussed.
3. Treatment generally of *Salmonella* meningitis is still unsatisfactory.
4. The completely successful outcome in this case may have been due to using a combination of streptomycin and sulfadiazine.

The authors wish to express their thanks to Dr. E. L. Barton, Director Provincial Laboratory, Toronto, for the final identification of the *Salmonella Newport* and the agglutinations done with the patient's and the parents' sera, as well as to Mr. J. R. Wilson, Department of Bacteriology, Ottawa Civic Hospital, for the original isolation of the organism.

ADDENDUM: Since preparation of this report, a paper has appeared (L. L. Henderson, *Am. J. Dis. Child.*, 75: 351, 1948) in which a case of *S. Newport* meningitis is reported, in a 3 1/2 month old infant, treated successfully with penicillin and sulfadiazine. Two fatal cases of

other varieties of *S. meningitis* are also reported, together with an excellent review of the literature.

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VOLVULUS OF THE CÆCUM*

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A VOLVULUS of the bowel has been described by Treves as an obstruction caused by a twisting of the bowel on itself, so that its lumen is closed by the pressure of a part of the intestine continuous with it or its mesentery. Volvulus of the cæcum is usually defined as a condition in which the torsion is limited to the cæcum, ascending colon and terminal ileum.

The first case of volvulus of the cæcum was reported by Rokitsansky in 1841. Since that time over 300 cases have been reported in the world's literature.⁸ In the Royal Victoria Hospital from 1919 to 1947 inclusive, there have been 69 cases of volvulus of the gastro-intestinal tract. In analyzing this figure, 55 have been in the large bowel, 7 in the small bowel, and 7 in the stomach. Volvuli of the cæcum have been 9 in number, that is, 13% of the total number of volvuli in the gastro-intestinal tract, or 16%

of the volvuli of the large bowel. Other workers have varied in their estimations of the incidence of this condition. Jacobson in 1924 (cited by Wolfer et al.⁸), states that 31.6% of all cases of volvulus are of the right colon. Sweet⁷ in 1935 gives 11.3% as the incidence of volvulus of the cæcum.

In this series there were 5 females and 4 males, this differs from the usual incidence in which the males predominate 3 to 1. The youngest patient was a 16-year old male and the oldest were two 73-year old females, and the average age for the series was 50.4 years.

The etiology of the condition is obscure, but it has been generally accepted that the beginning or predisposing cause is an abnormal degree of mobility of the cæcum, ascending colon and terminal ileum. This mobility is usually considered to be an embryological defect. Wolfer et al., dissected 125 human cadavers and found that in 11% the cæcum was mobile enough to develop a volvulus. These authors thought that the anatomical arrangement which best predisposed to a cæcal volvulus was one in which the cæcum was free and the ascending colon fixed somewhere along its vertical course. Other factors must enter into the etiology, because the condition does not, as a rule, develop until the patient has reached middle age. Suggestive factors have been overexertion, habitual constipation, adhesive bands, tumours of the cæcum, and pregnancy. In two of the series, Nos. 1 and 4, chronic constipation was present, and in one, No. 7, there was a four months' pregnancy. In this latter case the volvulus was caused by a rotation about a band of adhesions stretching from the posterior surface of the abdominal wall in the region of an old appendiceal scar. In one other case, No. 4, a large ventral hernia was present. However, in many of the cases there was no definite anatomical abnormality present that would account for the development of a volvulus. These cases might fall into the group which have as an etiological factor a probable disorder of the physiological function of the colon. Other authors, particularly Homans,⁴ stress this physiological factor in the formation of a volvulus.

The direction of the rotation of the volvulus has been a subject of much controversy. This is largely due to the various authors ascribing different interpretations to the terms clock-wise and counter clock-wise, and has been pointed

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Case	Symptoms	Physical findings	Laboratory data	Pathology	Treatment	Results
1 M. 50	1. Intermittent crampy abdominal pain—7 mos. 2. Loss of wt. 165-130 lbs.—7 mos. 3. Constipation, severe, 3 mos. 4. Nausea and belching, 3 days. 5. Severe colicky pain, 3 days.	T.98, P.60, R.22. Definite mass in right side of umbilicus, peristalsis visible, marked tenderness with muscle spasm over this mass. Rectal—enlarged, hard prostate. Respiratory system—râles at both bases.	R.B.C. 4,700,000, W.B.C. 8,800, Hgb. 90%, Urine—0. B.W. 4 plus. X-rays: barium meal—small bowel obstruction. Barium enema—barium stopped at transverse colon mid point.	Volvulus consisted of cæcum, ascending colon and terminal 4" of ileum twisted on its mesentery compressing transverse colon.	Right rectus incision. Dilated cæcum emptied through root of appendix then removed. Volvulus clockwise was untwisted and cæco-coloplicopexy done. Wound drained.	No postoperative complications. 33 days in hospital.
2 M. 45	1. Crampy abdominal pain with belching lasting 1 hr. on 3 occasions in the past 10 months. 2. Constipation and melena—24 hours. 3. Severe abdominal pain, nausea and vomiting—24 hours.	T.99, P.60, R.20, B.P. 110/64. Distended, tender abdomen with splinting in lower half. There is a sausage-shaped movable mass in the left lower quadrant.	Urine: Alb. 1 plus. Blood 1 plus. X-rays: Flat plates. Fluid levels in small bowel. Barium enema—barium stopped at mid point of transverse colon.	Volvulus consisted of cæcum, ascending colon with long mesentery (reported as twisted in anticlockwise direction).	Right rectus incision. Distended cæcum and ascending colon. Volvulus reduced. Appendicostomy done.	No postoperative complications. 12 days in hospital.
3 F. 43	1. Increasing colicky abdominal pain—8 hours.	T.97, P.82, R.20, B.P. 140/94. Bulging mass in R.L.Q. of abdomen with tenderness and some splinting on palpation.	Urine—0.	Volvulus consisted of cæcum, ascending colon and transverse 28" of ileum.	Right rectus incision. Volvulus reduced and cæcostomy through small grid-iron incision.	No postoperative complications. 15 days in hospital.
4 F. 73	1. Increasing constipation—2 mos. 2. Absolute constipation—8 days. 3. Abdominal distension, colicky pain, vomiting, increasing 2 days.	T.101, P.120, R.22, B.P. 156/66. Patient semicomatose. Abdomen markedly distended with midline below umbilicus scar with ventral hernia (5 cm. in diam.) protruding. Entire abdomen tender and resistant to palpation.	Urine—Alb. trace.	Volvulus consisted of cæcum and ascending colon. Cæcum has small perforation at operation.	Incision first made over ventral hernia and free gas found in peritoneum. Large, distended cæcum palpated. First incision closed. Left paramedian incision made. Cæcum delivered and volvulus reduced. Cæcostomy done.	Died 12 days after admission. Peritonitis and myocardial failure.
5 M. 16	1. Indefinite attacks of anorexia—2 yrs. 2. Sudden pain in R.L.Q. of abdomen rapidly increasing in severity—8 hours.	T.97, P.70, R.20, B.P. 116/68. Diffuse tenderness in R.L.Q. of abdomen with rebound tenderness. Rectal—tenderness in right side.	Urine—0. W.B.C. 11,900.	Volvulus consisted of cæcum, ascending colon and 5 feet of terminal ileum. Long mesentery present.	McBurney incision made and closed. Right rectus incision made. Volvulus of cæcum, and ascending colon (anti-clockwise) was reduced and many adhesions cut. Appendix removed.	No postoperative complications. 14 days in hospital.
6 F. 72	1. Severe tearing pain in back—intermittent for 6 days. 2. Chills and fever—4 days.	T.101, P.100, R.20, B.P. 170/92. Markedly distended abdomen with some rigidity. Respiratory system—blowing breath sounds right lung base.	Urine—0. W.B.C. 16,000. X-ray: Large distended loop of large bowel.	Volvulus consisted of cæcum and ascending colon.	McBurney incision made and then closed. Right rectus incision made, volvulus found high in abdomen, reduced, and appendix used to fasten it to anterior abdominal wall. Given sulfapyridine by mouth.	No postoperative complications. 28 days in hospital.
7 F. 26	1. Severe abdominal colicky pain—3 days 2. Nausea and vomiting 3 days. 3. Amenorrhœa—4 mos.	T.98, P.90, R.20, B.P. 100/65. Abdomen distended and tympanitic. Probable enlarged and pregnant uterus.	Urine—0. B.W. negative. X-ray: Moderate localized distension with fluid levels in region of upper jejunum.	Volvulus consisted of cæcum and ascending colon about an adhesion in region of appendiceal scar. Four months' pregnant uterus.	Right rectus incision. Volvulus of cæcum and ascending colon about a band of adhesions in region of old appendiceal scar. Adhesions cut and cæcum replaced in R.L.Q. Given sulfapyridine by mouth postoperatively.	No postoperative complications. 17 days in hospital.
8 F. 73	1. Increasing crampy abdominal pain—2 days. 2. Abdominal distension, and vomiting—1 day. 3. Absolute constipation—2 days.	T.98.7, P.62, R.20, B.P. 130/70. Abdomen greatly distended splinting most marked in R.L.Q. Rectal: mass felt in right side of pelvis. C.N.S.: Parkinsonism.	Urine—0. W.B.C. 18,000. Hgb. 94%. X-ray: dilated loops of large and small bowel. E.C.G.: Bundle branch lesion myocardium.	Volvulus consisted of cæcum, appendix, ascending colon and 9 cm. of terminal ileum which were infarcted, most marked in cæcum.	Decompression with Levine tube and Wangenstein suction. Right grid-iron incision made under local. Incision enlarged and volvulus of cæcum and ascending colon was reduced by rotating 180° anti-clockwise. Right hemicolectomy done and side to side anastomosis of transverse colon and ileum done. Pre- and post-operative penicillin, streptomycin, blood transfusions etc.	No postoperative complications. 34 days in hospital.
9 M. 56	1. Crampy epigastric pain radiating to left shoulder—4 days 2. Constipation—4 days. 3. Nausea and vomiting—1 day.	T.96.4, P.90, R.22, B.P. 150/95. Abdomen markedly distended and tympanitic. Few borborygmi heard. Chest—rhonchi in both lung fields.	Urine—0. W.B.C. 28,500. Hgb. 104%. B.W. negative. X-ray: Lung fields clear, left diaphragm elevated. Barium enema—intestinal obstruction, transverse colon.	Volvulus consisted of cæcum, ascending colon, terminal ileum rotated over 3 complete clockwise turns. Microscopic examination showed hyperemia, œdema and necrosis.	Partial decompression with Levine tube and Wangenstein suction. Right paramedian incision. Reduction of volvulus after aspiration. Resection of cæcum, ascending colon and terminal ileum. Ileocolostomy done. Closure of colostomy 1 month later. Pre- and post-operative penicillin, blood transfusions.	Postoperative course complicated by excoriation of skin around ileo-colostomy. This was controlled and successful closure done. 49 days in hospital.

out before by Graham³ and others. Most authors think that in describing clock-wise and counter clock-wise movements, the face of the hypothetical clock should be toward the operator. The original idea of Von Zoege-Manteuffel was that the medial attachment of the mesentery accounts for the clock-wise rotation. Anatomically, however, it appears that the direction of the rotation is largely dependent on the presence or absence of a common ileo-colic mesentery and the amount of fixation of the ascending colon. If the mesentery is present, the initial rotation would probably be counter clock-wise, but if the ascending colon is fixed then the initial rotation may be clock-wise.⁶ In analyzing this series no definite conclusions as to the direction of the rotation could be drawn in many cases, because they were done over a period of years by various surgeons.

The clinical and pathological findings, treatment and results of the nine cases are summarized in Table I. Two cases, Nos. 8 and 9, are described in fuller detail.

CASE 8

This 73 year old white female was admitted to the Royal Victoria Hospital on October 24, 1947. Her complaints were crampy abdominal pain increasing for two days with abdominal distension and vomiting for one day, and absolute constipation for two days. She was admitted to the Medical Service where a diagnosis was made of (1) acute intestinal obstruction, (2) bundle branch lesion, (3) Parkinson's syndrome.

Physical examination.—Temperature 98.7°, pulse 68, respirations 20, blood pressure 130/70. The patient was an elderly female with a mask-like facies and a coarse Parkinsonian tremor of the extremities. She complained of abdominal pain. The abdomen was markedly distended and hard, particularly in the lower quadrants, with visible peristalsis and audible borborygmi. Rectal examination was negative.

Laboratory data.—Urinalysis was negative. White blood count was 18,000, and haemoglobin was 94%. A survey film of the abdomen demonstrated dilated loops of small bowel with fluid levels and a markedly distended loop of large bowel extending from the right lower quadrant slightly upwards across the midline into the left pelvis (Fig. 1).

Operation.—The patient's condition was very poor, systolic blood pressure being 65. Local anaesthetic was used. A grid-iron incision was made in the right lower quadrant and on opening the peritoneum blood-stained fluid escaped. A greatly distended caecum was encountered and the appendix was gangrenous. The abdominal incision was extended upwards and downwards and the caecum was aspirated with a needle. The caecum was collapsed and delivered into the wound and was found to have formed a volvulus with the ascending colon, and to have rotated 180 degrees in a clock-wise direction. When this volvulus was unwound the caecum and ascending colon were also found to be gangrenous. The involved bowel was resected, cutting through the terminal ileum about 24 cm. from the ileo-caecal valve and through the transverse colon. A DePetz clamp was used. Following this the ends of the small bowel were turned in and a side-to-side anastomosis was done between the ileum and the transverse colon. Two cigarette drains were inserted into the peritoneal cavity and the

wound was closed in layers about the drains. At the completion of the operation the patient's blood pressure was 110 systolic, and she was in much better condition.

The postoperative course was uneventful and she was given penicillin 125,000 units q.3 h., and streptomycin 100,000 units q.3 h. for ten days. The only complication was diarrhoea, and this was fairly well controlled by bismuth by mouth. Since discharge her general condition has improved with return of appetite and strength. She has had, however, difficulty in controlling her bowels, and her Parkinsonian condition has progressed.

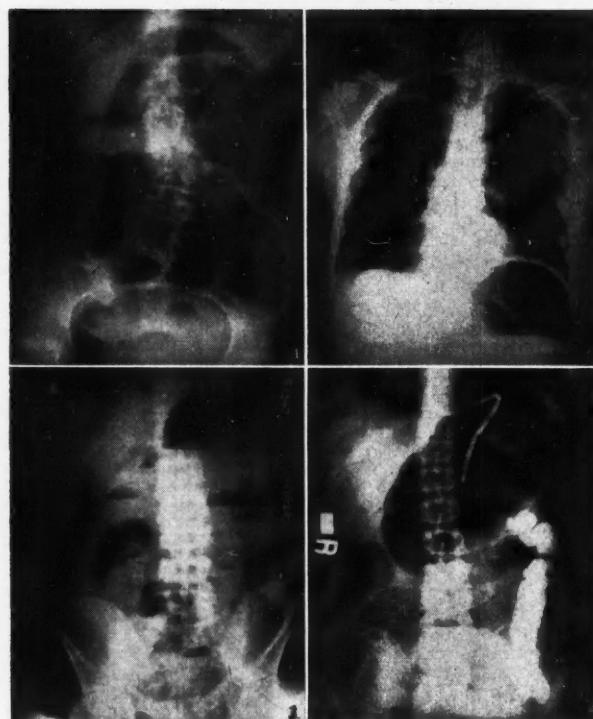


Fig. 1. (Case 8).—Survey film of the abdomen. Note the markedly distended loop of large bowel lying transversely in the abdomen at the level of the brim of the pelvis. There are several dilated loops of small intestine in the upper abdomen. **Fig. 2. (Case 9).**—There is a prominent large gas-filled loop of intestine with a fluid level immediately beneath the left diaphragm which is slightly elevated. Both lung fields are clear. **Fig. 3. (Case 9).**—The dilated loop of intestine with a fluid level is present beneath the left diaphragm. There are several smaller loops of dilated small intestine lower in the abdomen. **Fig. 4. (Case 9).**—Barium enema. The flow of barium is seen to be arrested in the distal part of the transverse colon. A Levine stomach tube is seen in the upper abdomen in position in the stomach. The large dilated loop of intestine has not been decompressed.

CASE 9

This fifty-six year old white male was admitted to the Royal Victoria Hospital on November 5, 1947. His complaints were crampy epigastric pains, intermittent since November 1. These pains radiated to the left shoulder. There was a small amount of vomiting with nausea since the day prior to admission, with failure to move the bowels except on one occasion for four days.

Physical examination.—Temperature 96.4°, pulse 60, respirations 22, blood pressure 160/90. The patient was a well developed, well nourished male with a markedly distended, tympanitic abdomen. A few borborygmi were heard over the abdomen.

Laboratory data.—Urinalysis was negative. The white blood count was 28,500, and haemoglobin 104%. Blood Kahn and Wassermann were negative. The non-protein nitrogen was 48.9 mgm. %. An x-ray of the chest revealed both lung fields to be clear with the dome

of the left diaphragm markedly elevated (Fig. 2). An x-ray of the abdomen showed it to contain a large dilated gas-filled loop of intestine with a fluid level beneath the left diaphragm (Fig. 3). A Levine tube was put down into the stomach (Fig. 4) but the large air bubble was unaltered by suction through the tube. A barium enema revealed obstruction in the distal half of the transverse colon (Fig. 4).

Operation.—Several hours after admission, under spinal pontocaine anaesthetic, the abdomen was opened through a right paramedian incision. When the peritoneal cavity was opened free bloody fluid was encountered. On further examination a large distended mass was felt in the left upper quadrant. The abdominal incision was enlarged upwards and a tremendously dilated caecum and ascending colon were found forming the volvulus (Fig. 5). The pedicle consisted of the ileocolic vessels and the volvulus was found twisted three complete turns on its pedicle in a counter clock-wise direction. The proximal portion of the transverse colon was part of the volvulus and the transverse colon was depressed near its mid-point by the pedicle of the volvulus. In addition to being twisted on its pedicle the volvulus was also turned upwards so that the caecum and the appendix were in contact with the left leaf of the diaphragm, anterior to the stomach. The volvulus was aspirated and reduced. The involved portion, which in-



Fig. 5. (Case 9).—The pathological specimen consisting of a normal sized appendix and markedly dilated caecum, ascending and part of transverse colon with the terminal ileum which is also dilated. The appendix is seen at the left lower end of the specimen.

cluded the distal 12 cm. of the ileum, caecum, ascending colon and right half of the transverse colon, was resected. A double barrel ileocolostomy was brought out through the centre of the incision and the abdominal wound was closed in layers. A small vaseline gauze pack was used around the ileocolostomy. During the operation the patient received 500 c.c. of blood and 500,000 units of penicillin were left in the peritoneal cavity.

The postoperative course was satisfactory. The patient was kept on penicillin, intramuscularly, 90,000 units q.3 h. for two weeks. On November 19, a Mikulicz's crushing clamp was applied to the spur. On December 8, the colostomy was closed. Since discharge from the hospital the patient has been able to return to his occupation as machinist, and has gained twelve pounds since operation. He has had no further complaints.

DISCUSSION

The acute symptomatology of the entire series was very similar, all 9 patients having varying degrees of acute abdominal pain and

vomiting. The condition appears to have a certain degree of chronicity however, as demonstrated by the intermittent attacks of recurring abdominal pain over varying periods; in Case 1 for 7 months, in Case 2 for 10 months, and in Case 5 for 2 years. Chronic constipation was present in Cases 1 and 4. By inference it would appear that in many cases of volvulus there may be a partial, or even complete, rotation of at least 180 degrees which is temporary and may reduce itself. This would explain the intermittent attacks of acute abdominal pain. It is difficult to evaluate the part that constipation plays in the etiology of the condition. Whether constipation with chronic overloading of the large bowel is a factor in the production of the volvulus, or whether the intermittent volvulus is the cause of constipation, is not known. One might postulate, however, that the conditions predisposing to a volvulus of the caecum also cause constipation in some cases.

The diagnosis was not always made in this series, but was suspected in many of the cases. X-rays of the abdomen whenever taken always showed dilated loops of large and some small bowel, and barium enemas in Cases 1, 2 and 9 demonstrated a block in the transverse colon. Levitan and Weyrauch⁵ point out that in volvulus of the sigmoid the distended loop of sigmoid rises out of the pelvis and lies in the mid-abdomen, and may extend to the diaphragm. Young *et al.*⁹ stress the importance of scout films of the abdomen in intestinal obstruction as an aid in differential diagnosis. They point out that abnormally placed and dilated portions of the large bowel may often be identified as caecum, particularly when there is an absence of caecal outline in the right lower quadrant. They also stress the importance of the barium enema corroborating these observations.

In Case 9 a careful study of the x-rays would give a diagnosis. The flat plate of the abdomen showed small bowel obstruction with a hugely dilated loop of bowel or stomach under the left diaphragm. The failure of the Levine tube to empty the dilated loop ruled out the presence of a dilated stomach. A barium enema which filled the normal appearing rectum, sigmoid and descending colon, excluded a volvulus of the sigmoid. The dilated loop, by the process of elimination, must be the caecum and ascend-

ing colon in an abnormal position. The above fact, plus the clinical findings of intestinal obstruction, made a presumptive diagnosis of volvulus of the cæcum fairly obvious.

The treatment of the condition is early surgery. In this series the type of operation varied, but was satisfactory in all cases except No. 4. Here the volvulus had perforated and free gas was present in the peritoneal cavity at operation. This patient had a midline ventral hernia below the umbilicus which was found to contain omentum only. The volvulus was found to be perforated and was reduced and a cæcostomy performed. The patient expired twelve days after operation from peritonitis and myocardial failure.

The remaining cases were cured, and the types of operation varied from a simple reduction of the volvulus to a right hemicolectomy. Results of this series showed a death rate of 11%. This compared favourably with other reported series. Young *et al.* reported 7 cases with one death, that is, a mortality rate of 14%. Corner and Sargent² described a mortality rate of 66% in 57 cases, some of which were operated upon. Chalfant¹ gives a mortality of 59% in 96 patients not treated by surgery.

SUMMARY

Volvulus of the cæcum has been described and a series of 9 cases which occurred from 1919 to 1947 at the Royal Victoria Hospital have been presented. The clinical and pathological findings have been analyzed with two cases being presented in detail.

The use of survey films of the abdomen and barium enemas and gastric intubation with a Levine tube have proved most useful in making a preoperative diagnosis. The criteria acceptable for such a diagnosis are presented.

The treatment in all cases was immediate surgery preceded by decompression and restoration of fluid and electrolyte balance. The extent of the surgical interference was primarily dependent on the state of the bowel in the volvulus, and secondarily on the condition of the patient.

The results were satisfactory in all but one case in which the patient had a perforation of the volvulus with peritonitis at the time of operation and expired postoperatively. The remainder of the cases recovered and the average stay in hospital was 23 days.

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THE GENERAL PRACTITIONER AND RHEUMATIC DISEASE

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IT has been stated that in the United States rheumatism leads the list of specified chronic diseases and that the resultant disability exceeds that from tuberculosis by a ratio of 10:1, that from diabetes by nearly 10:1, and that from cancer and tumour by 7:1. A survey of 25,000 households across Canada, including 60 to 70,000 persons over 14 years of age, was made by the sampling unit of the Dominion Bureau of Statistics in November, 1947. A preliminary estimate of the results of this survey indicates that in the month of October, 1947, 22.6% of an estimated seven million days lost on account of all illnesses were ascribed to arthritis or other rheumatic disease. It is further estimated that about 7% of the total adult population of Canada of fourteen years of age and over is afflicted with arthritis or rheumatism in some form, and that about one-quarter of the persons suffering from arthritis in Canada have never had any medical care or advice. Accurate statistics are difficult to obtain but in no country would rheumatic diseases appear to be an important cause of death. This may be one of the reasons for the lack of more energetic measures for their control.

The importance of the full use of all available manpower brought out by the last war may account for the recent widespread recognition by health authorities of the wastage caused by rheumatic conditions. No more than passing consideration of this wastage shows the importance of so-called rheumatoid arthri-

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tis and the wide range in degree of disability it produces. Since disability is relative it must be obvious that here is a field in which tremendous savings in terms of national manpower and personal independence are at least potential.

This paper is in the nature of a plea for greater interest on the part of the general practitioner in the common rheumatic diseases.

Much research is required into causes, classification, special treatment and other aspects of the control of the rheumatic diseases. It would seem reasonable that a prerequisite for such research on a truly effective scale would be the grouping of patients in connection with first-class teaching hospitals. We no longer think of the arthritic as almost certainly headed for helpless invalidism or custodial care but to many physicians he presents a hopeless problem in treatment with which he feels powerless to deal. If medical students, interns and the general practitioner referring cases could be taught more of what is known about the rheumatic diseases and the proper application of that knowledge, much would be accomplished toward improved care and toward a general awakening of interest on the part of both the profession and the laity. Research costs money and whether funds are to come from public coffers or popular subscription they will only become available in response to public demand. The educational value of the popular press notwithstanding, I think the intelligent and informed general practitioner is still the most effective moulder of public opinion on medical affairs and a most potent agency for awakening public interest in this very important subject. A comparison of the public expenditures on the control and treatment of such diseases as poliomyelitis, tuberculosis, cancer, diabetes, heart disease and the rheumatic diseases with their prevalence and effects as shown in the recently published "Ninth Rheumatism Review" of the American Rheumatism Association is startling to say the least. It causes one to wonder whether the medical profession has been somewhat remiss in its advisory duty in permitting such a disproportionate allocation of public funds without protest, or in failing to press more strongly for interest in this tremendous wastage of manpower.

Regardless of the establishment of research or special treatment centres the vast bulk of rheumatic disease will continue to be the responsibility of the general physician. And it is well that such is the case, because in no condition is it more important or gratifying to treat the patient as well as the disease. The economic and social factors are of great importance and must be given due consideration in planning a regimen of treatment or activity. There is little purpose in advising the grocery clerk with three small children to take his wife on a three-month holiday in a warm climate in the hope of improving her arthritis. But a great deal can be done toward assisting a partially disabled person in selecting employment compatible with his condition. Such a course not only relieves the fear and worry of dependence but assists in rehabilitation more effectively than many hours of physiotherapy minus the stimulus of productive interest. A pampered and dependent family may frequently require a sharp reminder of the consequences of continuing excessive demands on a patient and uncomplaining mother, and may need to be persuaded that a sharing of responsibility may determine the outcome between moderately impaired activity or complete invalidism. These are matters in which no rules of procedure can be laid down. Every case must be thoughtfully considered on its own merits. It is a fair postulate, however, that no single person is in a better position or better equipped to weigh all the circumstances and give sound advice than the family doctor. Given proper supervision and care very few arthritides need become permanently unproductive cripples.

Not all important research into disease is carried on in hospital wards or university laboratories. Indeed, there is some danger that present-day methods of practice are leading to neglect of that very important field research which was so fruitful when modern medicine was in its infancy. Should we be inclined to disparage its utility in a highly scientific age, we should refresh ourselves on not only the work, but the life and times of such men as Jenner and Sir James Mackenzie. Much of academic interest remains to be learned regarding smallpox and heart disease, but the basic principles of control and treatment, laid down as the result of careful and

patient observation by these two general practitioners, have not only saved many lives but constitute important units in the educational armamentarium of the "modern" physician. A review of the knowledge of arthritic and rheumatic diseases suggests strongly that the most important future contributions may well be expected to come from careful observation and enquiry over long periods of time. And this observation must be directed not only on the disease entity but on all the many apparently trivial circumstances which make up the patient's social or economic life.

Since this paper is more in the nature of a plea for greater interest on the part of the general practitioner than a highly scientific exposition on rheumatic diseases, the subjects of diagnosis and treatment will be dealt with only briefly. An accurate diagnosis is, of course, a prime requisite to intelligent treatment. This may frequently be beyond the capabilities of the attending physician and will require the expert assistance of the consulting specialist. To deny the patient this benefit and to pursue purely empirical methods of treatment can only result in disappointment and discouragement for both doctor and patient and perpetuate inadequate care, professional disinterest and the flourishing trade in fads and nostrums. Various classifications have been prepared. One of the simplest is that approved by the American Rheumatism Association for inclusion in the "Standard Nomenclature of Diseases". Adoption of some such classification is to be commended in the interest of descriptive clarity and more accurate differential diagnosis. It is sometimes extraordinarily difficult to establish an accurate diagnosis. This is particularly true in some of the early cases of rheumatoid arthritis in which proper treatment shows its most beneficial results. To delay the seeking of competent assistance until disability or deformity make the diagnosis obvious is scarcely excusable on any grounds, including those of financial consideration for the patient.

Regardless of subsequent disposal, every patient presenting a complaint of pain or stiffness in the region of one or more joints deserves a most thorough history and physical examination. The enquiry should include such things as family history, racial origin, climatic conditions, seasonal variations in symptoms, social

and hygienic environment, general physical and mental stamina and the influence of trauma. The rôle of psychological stress in arthritis is still the subject of considerable controversial opinion. Whether the peculiar emotional picture, with its strange mixture of discouragement and stoicism, exhibited by so many arthritics, is cause or effect, there must be few cases indeed that would not benefit by treatment based at least in part on sound psychological assessment. While the occasion for a psychiatrist's assistance may rarely arise, the general practitioner can here display his complete superiority over the specialist in the application of elementary psychology and sound common sense. This, in turn, must be based on a complete knowledge and understanding of his patient as a person and on his capacity for temporary detachment from a too scientific outlook. The laboratory procedures indicated in the rheumatic diseases are, generally speaking, simple and universally available. Sedimentation rate, hæmoglobin estimation and red cell count can be performed in the doctor's offices and are useful indices in planning treatment or estimating progress. The importance of x-ray examination in diagnosis must be so obvious as to scarcely merit mention. Nevertheless it is omitted with extraordinary frequency in even moderately advanced cases. The frequency with which cardiac lesions similar to those found with rheumatic fever are found at autopsy in cases of rheumatoid arthritis suggests close scrutiny of the heart including electrocardiogram and chest films as a routine procedure wherever a competent interpretation is available.

Paramount in treatment is the importance of adequate rest. It is surprising what can be accomplished in economy of energy and relief from trauma to inflamed joints by a judicious rearrangement of normal routine. For the acutely ill patient complete bed rest may be essential. Here it is most important that the physician should be frank and clear in his advice. Given sound reasons why they should do so, there are few arthritics who cannot or are unwilling to undertake a period of rest in bed. Enquiry into those cases which have not had adequate rest usually reveals that the physician's advice has been vague, unconvincing and not enlightening as to the profitable employment of a prolonged period of enforced

idleness. For the ambulatory patient instructions should be specific as to hours of rest in bed, amount of walking or standing, or limitation of specific activities, of an occupational or recreational nature, which traumatize affected joints or produce excessive fatigue. In the more acute stages sleep may be seriously interfered with. The free use of salicylates will often make this sound and restful for a part of the night at least and the patient awakens refreshed rather than exhausted by prolonged inability to make himself comfortable. Chronic arthritics should be advised to spend half their time in bed. I am sure there are few cases, who have experienced the beneficial effects of twelve hours out of the twenty-four spent in complete rest, who will refuse to accept such a routine of treatment or make strenuous efforts to achieve it by rearrangement of their activities.

Almost all, if not all physiotherapeutic measures useful in arthritis can be provided in the average home at very small expense. Warm aqueous or paraffin baths, which are so soothing and restful to stiff and aching joints and spastic muscles, coupled with a few simple daily exercises, outweigh in value much of the complicated electro-thermal equipment upon which the patient gazes with awe and vain hope. Exercises must be well-directed, with the objective of not alone preventing unnecessary muscle atrophy and limitation of movement but also of avoiding undue trauma to inflamed or swollen joints. If splints are employed in the more acute stages, they should be abandoned as soon as they have served their purpose. I recently saw a boy so badly crippled that he required crutches. His arthritis had long been quiescent but he gave a history of wearing a forgotten plaster cast for six weeks and spending three or four months in bed with no attention except ordinary nursing care. The disastrous results of such neglect in the early stages of arthritis, particularly in the young patient are reflected in a tremendous toll of permanent disability and lost manpower. Massage and passive movements in the active phase of the disease are useful adjuncts to, but for psychological as well as physiological reasons, should not replace daily active effort on the part of the patient to move his joints through that full range which is limited by definite discomfort. An intelligent and

well-trained physiotherapist can be of great assistance in instituting such a course of therapy and is usually available for home visits in all but the most remote communities.

Where the range of movement is minimal and risk of fixation is considerable, it is important, of course, to maintain a position of maximum usefulness. This applies particularly to the spine and larger joints. A basic principle in the management of the arthritic patient is the prevention of permanent deformity or disability during the active phase of the disease. In that respect arthritis may be considered self-limiting. But resultant deformity is difficult or impossible to correct and goes on for the lifetime of the patient.

Closely allied to the importance of physiotherapy is that of occupational therapy. Here again well-trained therapists are usually available with a wide range of activities well within the patient's physical capacity. The value of such a regimen is difficult to overestimate. It not only provides purposeful and natural activity for otherwise idle muscles but minimizes the feeling of frustration and dependency which can so readily develop into indifference and despair. In many cases new avenues of interest are opened up which may become the basis of change to more suitable occupation or at least to hobbies which will replace activities permanently lost. A word of caution should be mentioned here. The therapist is at all times the assistant in treatment. The physician should never lose contact with her activities and should always stand ready to lend approval or suggest modifications as he feels the condition or progress of his patient indicates.

I have already mentioned the importance of simple, homely psychotherapy. Two features of the patient's mental attitude bear special consideration: his willingness or desire to get well enough to be independent and his ability to accept his situation and make the best of it. In both instances the general physician can be of great assistance. No prolonged series of sances or complex psycho-analytical discussions are required. What is required, however, is the occasional devotion of an hour or more to calm and reasonable discussion with his patient. Discussion which not only gives the patient an opportunity to "unload" and give free vent to his pent-up emotional reactions, but, with the physician's experience and

sympathetic understanding, assists him in reconstructing an outlook and attitude more in harmony with his capabilities. Whether it is dignified by the term psychotherapy or called by some other name matters little. The important thing is to detach oneself a little from a coldly scientific approach, to bring the patient's condition within the range of his comprehension and then to assist him to bring common sense to bear on the solution of his problems in exactly the same way as has been practised by good family doctors for many generations.

Most arthritics are somewhat undernourished and hæmoglobin levels are apt to be low. Some attention to diet and supplementary supply of vitamins may be indicated. Great care should be exercised, however, to avoid having the patient attach an undue degree of importance to such general measures and thereby encourage his indulgence in any one of the many dietary "fads" or, worse still, contribute substantially to the financial support of the unscrupulous purveyors of vitamin "cure-alls".

Removal of "foci of infection" which are grossly obvious may result in some improvement in general health. This approach must also be made with caution and without the offer of too much hope of immediate cure. I am certain that in many cases the prescription of two weeks' rest in bed would give equally beneficial results to those obtained by a tonsillectomy, wholesale tooth extraction or removal of a suspected gallbladder.

It is not within the scope or purpose of this paper to discuss the many "specifics" which have been or are now being employed for the treatment of arthritis. Their very multiplicity argues against the constant value of any one of them. It is a matter of some regret that some physicians can always be found who will lend their names and professional degrees to the financial exploitation of unproven remedies offered as panaceas to cover all cases. The attending physician should never be led by flamboyant advertising, or any other form of pressure, into trying one or more such products over a prolonged period of time to the neglect of the more simple and tried methods of treatment. As stated above the early and the acute cases deserve the benefit of the best consultant advice available, lest a trial-and-error method

of treatment permit them to slip into a stage of chronicity which prejudices the possibility of shortening the course of the disease or ultimate complete cure.

Special mention of the use of gold salts is perhaps permissible because, at the moment, it constitutes the one "specific" form of treatment which is commanding the greatest degree of interest among rheumatologists throughout the western world. Much attention is being given to indications, mode of action, prevention and treatment of toxic manifestations and evaluation of its effects. For practical purposes it is important to know that suitable cases should be carefully selected, that dosage should be carefully controlled and that the importance of adequate rest, nutriment and other supportive measures of a general nature be kept constantly in mind. Under no circumstances should the patient be permitted to even hope that he can one day neglect all these measures in compensation for the risk and expense attendant upon one or more courses of chrysotherapy. Treatment with gold is not suitable for the use of the general practitioner who may employ it occasionally or on a purely empirical basis. When given in carefully selected cases and under the guidance of expert and experienced advice, it is attended with little danger of serious toxic reactions and with some hope of amelioration of the disease.

Many physicians may be inclined to compromise with their professional conscience in the administration of specific forms of therapy with a view to maintaining the patient's interest and preventing his drift toward quacks and nostrums. Each physician knows best his own methods and his own patients and it would be presumptuous of me to discuss the merits or demerits of such procedure. I do feel, however, that the establishment of patient confidence through a policy of complete honesty and sincerity is still the soundest sheet anchor for doctor-patient relations: relations which may become more than usually strained during the long period of professional care characteristic of rheumatic disease. Here is where the physician's capacity to practise his profession as an art as well as a science is called into full play and where the measure of his achievement can be computed in terms of personal benefit as well as scientific eradication of disease.

THE PROBLEM OF LEAD POISONING

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THERE have been many articles written, many pamphlets published, and much ado in the medical world concerning lead and its effect on the human system when absorbed through the respiratory, digestive, or skin tracts.

I would say, for the great majority of men who come in contact with a sporadic case, the nomenclature used today is the same as used in former days and has not been changed, even by the reasoning of the great experts who expound "this" today and "that" tomorrow.

If in a normal individual, without any lead exposure, the urinalysis shows lead excreted by the urinary tract, what is one supposed to tell this layman; that he has lead poisoning, is on the threshold of lead poisoning, or that he must investigate the water supply in his city or the kitchen utensils in his home?

Is the term "lead poisoning" the one to be used where lead is excreted by the urinary tract? Is stippling, which is frequently found in blood cells, a criterion of lead absorption? Is the agglutination test devised by McCord a sure one, even though not used to any great extent as yet? What about the porphyrin test? Is lead hysteria the result of the term lead poisoning?

To me, there are two tests; concentration of excretion in urine, and, lead concentration in the blood.

Dr. Charron, of the Department of Industrial Hygiene, Ottawa, gave what I think the best nomenclature to cover lead conditions, which leaves no doubt as to whether a condition is mild or serious. They are: (a) lead exposure; (b) lead absorption; (c) lead intoxication; (d) lead poisoning. All vary in the degree of lead excreted in the urinary tract, and I think that a nomenclature such as this presents a solid foundation on which to work and will not be alarming to laymen, who should realize that there are different stages of intoxication with lead, as with alcohol.

Where there is a lead hazard in an industry, we feel it is absolutely necessary that the medi-

cal staff should know where the hazard is, the type of exposure, and what the best preventive measures are.

In one of our plants, where a definite lead hazard arose, we took the 50 men exposed and had their urine tested weekly for lead. Those showing excretion of 0.30 or more milligrams per litre were given complete physical and blood examinations and were removed from the cause.

It was striking to note that in a number of cases, when the exposure was removed the excretion of lead in the urine temporarily increased, showing a storage in the system that was kept under control by the threshold of absorption. Once this threshold was released, the flood gates evidently gave away and the increase in excretion was found. Does this indicate some nervous, or metabolic irritation, or involvement that changes with the stimulation or sedation or absorption?

In this plant we also picked out 12 men with no known exposure to lead, and found that they ran from 0.01 to 0.12 milligrams per litre in excretion of lead through urine, the average being 0.08, so I do not see where an excretion of 0.10 indicates a dangerous lead hazard. It is my observation that any person showing an excretion of 0.15 mgm. per litre has reached the bottom limit for lead exposure and 0.30 should be the top level indicating absorption. When it gets to this stage, a complete physical examination, including complete blood and quantitative lead in blood, should be made.

I would say from our experience, that persons having 0.50 have come to the intoxication stage, and there are definite blood changes as to stippling, anæmia, etc. In these cases, the patient should be given complete, competent medical attention. Anything beyond that goes on to the lead poisoning stage with muscle and nerve involvement, which is not only serious, but also very, very dangerous. With proper plant supervision, this should be averted.

When there is lead exposure, particularly of the volatile nature, the precautions against absorption should be rigidly enforced, because where we are dealing with the health of an individual, and perhaps his future, we have a responsibility towards him and his family.

When men are going to work where there is a definite lead hazard, a physical and complete blood examination, should be made, so that a

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rational follow-up of the man's physical condition may be ascertained later.

Exposures are of three main types: (1) Where dust is inspired, the most dangerous of all sources, whether respirators are worn or not. (2) Absorption through the gastric tract, which may occur if hands are not washed before eating or smoking, where clothes are not changed to avoid contamination of food and utensils. (3) Absorption through the skin, which is not as common as either of the others, but is a possibility, particularly in hot weather and especially where the dust is volatile in nature.

Any acute infection such as influenza, pneumonia, septicæmia, etc., increases the danger of lead absorption, so that when people are subject to lead exposure, their general health should be watched very carefully.

The proper type of positive air pressure masks is absolutely essential. There should be one man in charge of fitting, etc. Interchange of masks should be absolutely forbidden. Rotation of men working in exposures should be the accepted practice.

Chipping the paint off the area to be cut with the torch may affect the concentration of lead dust in the air. Cutting should be done from the outside, never in confined spaces. Washing hands before eating and smoking

should be controlled. Changing clothes before going home or eating is a very wise procedure. If these precautions are followed out, the danger of lead poisoning is not too great. When all is said and done, curtailment of lead absorption and intoxication is a co-operative effort. The employer supplies safeguards, and the employee should make use of same to the fullest extent. Milk seems to have a definite value. A quart of milk should be given each man daily.

After discussing lead exposure, lead absorption, detailing preventive measures, etc., it might be well to say a few words as to the treatment that has been handed down through the years.

We are told in one book to try acid treatment, and, if that does not work, to switch to alkaline. We are also told to build up the health of the individual, which would be done in any case of sickness or accident. It is suggested we treat anæmia, which we are told on another page, is never marked and in our experience the blood has shown both the colour index, and cell count to be about normal. The giving of milk during exposure and treatment is more to offset the weakness of the patient and then, again, with proper precautions, we should never reach this stage.

TABLE I.

No.	Exposure	Blood	Hgb.	Urine mg/l	Hgb.	EXPOSURE REMOVED							
						1st week	2nd week	3rd week	4th week	5th week	6th week	7th week	8th week
1	"A"	4 mos.	pos.*	82%	0.23	78%	0.28	0.26	0.19	0.16	0.20	0.18	0.10
2	"B"	24 mos.	pos.	80%	0.23	75%	0.06	0.14	0.18	0.11	0.13	0.10	0.13
3		4 mos.			0.24		0.24	0.13	0.20	0.10	0.18	0.10	0.11
4		9 mos.			0.14		0.33	0.36	0.25	0.28	0.20	0.18	0.13
5		27 mos.			0.50		0.70	0.58	0.54	0.54	0.40	0.19	0.26
6		4 mos.	pos.	81%	0.20	85%	0.12	0.20	0.16	0.12	0.10	0.08	0.11
7		26 mos.	pos.	80%	0.29	90%	0.19	0.17	0.14	0.14	0.18	0.07	0.13
8		11 mos.			0.29		0.34	0.21	0.20	0.20	0.19	0.18	0.12
9		?			0.19		0.16	0.14					
10		17 mos.	pos.	82%	0.25		0.18	0.18	1.13	0.18	0.06		
11		6 mos.	pos.	82%	0.15	92%	0.30	0.20	0.14	0.12	0.12	0.13	0.11
12		15 mos.			0.13		0.30	0.09	0.13	0.10	0.03	0.05	
13		8 mos.			0.17		0.21	0.10	0.23	0.18			
14		8 mos.			0.15		0.22	0.15	0.26				
15		8 mos.			0.10		0.14	0.11	0.11				
16		1 mon.					0.12	0.16	0.09				
17		8 mos.			0.05		0.08	0.09	0.09				
18		8 mos.			0.13		0.15	0.13	0.10	0.16			
19		5 mos.			0.13		0.08	0.15	0.16				
20		?			0.13		0.07	0.05					
21		?			0.11		0.08	0.10	0.08	0.05			
22		8 mos.			0.13		0.15	0.08	0.21	0.15			
23		?		82%	0.24		0.45	0.26	0.23	0.29			
24		27 mos.	pos.	90%	0.20		0.19						

*Pos. means stippled cells.

The above is a partial list of employees Dominion Steel Plant who were exposed to lead while cutting old ships with acetylene torches.

On the whole, I feel that it is time that some organized body made a thorough investigation of the lead question from a common sense standpoint, and gave the general practitioner something to work on.

Appended hereto are some statistics worked out in connection with our exposure and handling of men exposed. The list is not complete, but it does include those most affected and those least affected. Specific gravity is about normal in all cases. Volume of urine 50 to 100 c.c. We stopped cutting ships temporarily until such time as we could find out the most practical and effective way of protecting our workmen.

Case reports are given on two men affected, who were treated for blood changes and a somewhat run-down condition while they continued working. One other case did not come directly under our supervision and this man was paid compensation for a number of weeks, which resulted in a financial loss to him, because he did not carry on with his work as we feel he might have.

CASE 1

Mr. A.'s examination showed him to be somewhat pale, well nourished, with pulse rate 60 and blood pressure 122/72. No abnormal findings throughout the examination. Lumbar puncture was not done, so we do not know the concentration of lead in the spinal fluid. See Table for urinalyses.

1. Hæmoglobin	82%
Red blood cells	4,500,200
White blood cells	7,800
2. Hæmoglobin	78%
Red blood cells	4,130,000
White blood cells	10,800
3. Hæmoglobin	82%
Red blood cells	4,390,000
White blood cells	10,000

He is feeling much better and has been able to carry on with his work.

CASE 2

Mr. B.'s examination shows him to be very slight in stature, somewhat pale. Teeth and gums in good condition. Pulse 84, blood pressure 122/80. He was normal except for his weight. He is feeling very much better and has been able to carry on with general labour, without any loss of time or income.

1. Hæmoglobin	80%
Red blood cells	4,465,200
White blood cells	7,400
2. Hæmoglobin	75%
Red blood cells	4,301,000
White blood cells	7,200
3. Hæmoglobin	86%
Red blood cells	4,350,000
White blood cells	6,000

The important things about the case histories are that the men did not lose time, did not get lead phobia and that they could be treated while carrying on at their work and brought back to normal without any loss of earnings or control handicap.

The laboratory work in these statistics was done by the Provincial Laboratory in Halifax, under the direction of Dr. MacKenzie. Some of the bloods were done at the Provincial Laboratory, others at the local hospitals.

Any suggestions, from persons interested enough to read this article, will be gladly received.

THE PSYCHOLOGICAL APPROACH TO THE PRESCHOOL STUTTERER*

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RECENT studies in the United States, particularly at the State University of Iowa, regarding the speech of children between the ages of two and five, have brought to light the fact that the majority of children, during this period of their lives, have frequent repetitions of words or syllables, hesitations, and blocks in their speech. As a result of these studies, it seems quite reasonable to assume that this phenomenon may well be a normal condition of speech development.

Acquiring speech is a complicated process, as we know, and it should be expected that obtaining fluency with spoken language is bound to be a gradual process. If parents had a more intelligent understanding of language growth, children would certainly not be labelled as stutterers in this preschool period. It is our belief that many children lose, instead of gain, in fluency of speech just because they are treated as stutterers. We all recognize in the field of health the value of preventive measures, so, in the field of speech pathology, we maintain that preventive measures can also be taken, particularly in the baffling disorder of stuttering, which in its growth presents a more and more complicated picture. Hence our special interest in the attack on the problem at the preschool level, where the disorder can

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be observed at its simple primary stage before psychological complexities have woven themselves around the actual difficulty with the speech itself.

The theory of stuttering, upon which our approach to the problem is based, is that stuttering is a symptom of such an increase in nervous tension in the child that the rhythm of speech is broken by periodic muscular spasms of a clonic or tonic type which produces either rapid repetitions of sounds or a momentary blocking in the production of sound.

Our immediate problem then should be to discover the cause, or causes, of increased nervous tension of the child brought to us as a stutterer. If one is fortunate enough to see the child at an early age, the approach can be indirect as far as the actual stuttering is concerned. It is to be assumed that, if the critical points of tension can be relieved, the stuttering should only be a phase in the speech development of the child and can be prevented from becoming a full-fledged condition of stuttering.

In order to discover these critical points of tension, a very thorough physical and psychological examination of the child is, of course, necessary. The child should first be examined by a physician and given a careful physical examination. The ideal situation is when the physician refers the case to the speech therapist and sends a report of the physical findings. The speech therapist's investigation naturally begins with the family history and the background of the child. It sometimes emerges that there have been stutterers in past generations. This is usually significant, more in terms of the anxiety it arouses in the parents than in the hereditary tendency of the child.

The developmental history and the present physical state of the child should be inquired into very thoroughly. Frequently clues to the state of tension can be discovered in the conditions of hypertonicity or hyperactivity revealed in the medical examination, or in some maladjustment brought to light in the detailed history of his development.

Have there been feeding problems, enuresis, other nervous habits such as nail biting or thumb sucking? Has there been difficulty in muscular co-ordination, as in learning to walk or in handling toys? An assessment of the child's intelligence, temperament, and present emotional behaviour all require careful study.

And finally there should be observation of the speech patterns, the extent of the vocabulary, the mastery or lack of mastery in articulation, and the child's reactions during stuttering spasms. The examiner should gather as much data as possible on the past and present environment of the child and his, or her, relationships with parents, nurse, siblings and teachers respectively. A careful investigation of these factors should enable us to discover the critical points of tension in the young stutterer's life.

In our examination of very young stutterers, we have found that an infinite variety of causes may produce undue emotional tension in the child. In the first place, there is the significance of the parents' act in bringing their child to you as a stutterer. This, we certainly believe, has its effect; that the parents have already referred to their offspring as a stutterer is in our view significant. This is cause enough to throw the child off balance in his speech. His parents instil the idea that there is something wrong with his way of speaking; and his attitude towards speech soon becomes tinged with fear. Fear itself is an emotional state of tension which can soon be revealed in wavering uncertain speech.

In our studies of many individual cases of these young stutterers, we have noticed that there are certain definite conditions which give rise to undue emotional tension. There are many cases of mismanagement of the child in establishing the routine habits of eating, sleeping, and elimination control. These functions are lifetime behaviour patterns, and, if formed in an atmosphere of emotional strain, can profoundly influence our lives, not only in speech but in temperament as well.

Another frequently occurring situation with our patients has been overstimulation in language at the period of early development of speech. This has been particularly so in cases of exceptionally bright children, who have developed speech very early, and have been pushed along still faster by enthusiastic parents, until a sudden break in fluency appeared.

Although less numerous, there have also been many cases in which the tension stemmed from the child's relationships with other members of the family: jealousy of one child for another; fear of a parent; or antagonism towards parental affection. Occasionally the child's un-

due tension seemed to arise out of some previous emotional shock or prolonged emotional strain. These latter considerations, however, had to be weighed carefully, we found, since parents often place emphasis on some isolated factor that has far more significance for them than for the child.

In other cases, stuttering has appeared to be the after-effect of a debilitating illness. This is a good indication of the influence of fatigue on speech. Each one of us, doubtless, has experienced a decrease in fluency during a period of overtiredness.

Sufficiently often we have found that a change to right-handedness of a left-dominant child brought on stuttering, and we, therefore, include it here as a possible cause. But close observation is necessary in this matter, for the deciding factor in the stuttering seems rather to depend on whether the enforced change upset the child emotionally or not.

The psychological approach to the preschool stutterer might be called an indirect approach, in that nothing directly is done about the speech itself at this period. The first advice to the parents is that they must, at all costs, prevent anxiety arising in the child's mind about his way of speaking. At this early period, there should be no restraint placed on the speech whatever; in fact, the child's speech should be accepted as normal speech.

It is by the first labelling of the child as a stutterer that the damage is done, because the attitude of the parent toward the child's speech assumes at once a different aspect, an attitude which is sooner or later felt by the child, and he reacts accordingly by finding speech more and more difficult to produce. Instead of dwelling on the breaks in the child's speech, attention should be directed to the states of emotional tension that bring on the breaks and difficulties in communication.

An important aspect the parents should consider is the relation of fatigue to speech fluency. In every case of a young stutterer particular attention should be given to rest and sleep. An afternoon rest is essential, and an early bed hour. If he does not sleep well, then the use of sedatives is not amiss.

A regularity in the routine of meals, rest, and eliminative functions gives the young child more security and, in the end, more freedom. Outside these routine activities, the child

should have as much freedom for play as possible. Emotional upsets should be reduced to a minimum. All too often parents, or those in charge of the child, produce emotional crises unnecessarily. Minor issues should not be made into major issues by the demands of a rigorous discipline or by a conflict of opinion as to how the situation ought to be handled. A lack of harmony in the method of handling the child can make him feel insecure; and insecurity leads inevitably to nervous tension.

Finally we come to specific situations wherein the psychological approach to the problem of stuttering in its early stages aims at discovering in each particular case where the root of the problem lies. From the examination of the child and history, the particular problems causing increase of emotional tension should be recognized and a plan worked out with the parents to bring about a release from nervous tension, by dealing with the individual problems in a psychologically sound manner.

The following examples are cited from case histories in our clinical files:

In case (a) a fluency in speech was attained only after the child had been placed in a Nursery School. The extreme anxiety state of the mother was transferred to the child and manifested itself in stuttering speech.

Case (b) is that of a little girl of four, brought to the Speech Clinic as a severe stutterer. The mother described her as getting so worked up that she became speechless. The history here revealed a healthy child, but one whose every meal was a battle to get the child to eat. It was suggested that, for the time being, we ignore her speech and tackle the problem of meals, so that the emotional storms over eating might be eliminated. Once the feeding problem was solved, the stuttering also disappeared.

Case (c) indicates how very varied the problems may be. The child was three years of age, an only child in good health, routine of meals and sleep excellent. The stuttering appeared a few weeks after the addition to the household of a mother and teen-age daughter from England. The teen-ager immediately monopolized the child, played with her a great deal, and talked to her, the accent of voice and her manner of speaking differing considerably from Canadian voices. Over-stimulation of the three-year old appeared to be the cause. The situation was carefully explained to the teen-age girl, and, with her interests increasing outside the house in her new school environment, the over-attention to the baby lessened and the child's speech became more fluent.

In case (d) the element of fatigue seemed to be linked with the stuttering. Sleep habits were poor. There was the same pattern of behaviour night after night, the child crying or calling out after he had been put to bed, a pain, thirst, fear of the dark, anything to gain attention and distract his elders. Night after night this boy did not fall asleep until after ten. Again the problem of establishing good sleeping habits was attacked and the stuttering ignored. In this case, sedatives were prescribed by the paediatrician before adequate sleep was obtained. The speech improved only when proper sleep habits were established.

With case (e) the disturbance of the rhythm of speech was linked up more closely with the development of speech itself. The stuttering appeared to be the result of undue pressure on the child to speak fluently at a very early age. At least no other evidence appeared in the history to account for his speech difficulty. This child was exceptionally intelligent and developed fluent speech very early. Unfortunately, the proud parents and relatives made a display of his language ability. He was taught to say nursery rhymes, taught his letters and word recognition before he was sufficiently matured in language to achieve such skills. Then came a sudden break in his early fluency. A change in tactics, an acceptance on the part of the parents of his hesitant speech, eased the situation, but, in this case, the stuttering did not decrease rapidly. The child had become too insecure with speech and did not regain fluency readily.

In closing, I want to mention a group of cases which has been of particular interest to me. These are cases in which the disorder of dyslalia, or difficulty with the articulation of sounds, is combined with the disorder of stuttering. A careful observation of these cases convinces me that the stuttering comes about because of an insecurity with speech sounds and their difficulty in making themselves understood. Without contradicting the theory I support—that is, of not working directly with the speech of young stutterers—I must say, nevertheless, that I do attack the speech directly in these combined dyslalia and stuttering cases. I do so with the object of building up the child's security with speech sounds. Such a child can work with sound exercises readily and the stuttering spasms do not occur during this rhythmic practice. Thus the stuttering *per se* is still ignored while the child, if skilfully handled, establishes good pronunciation. Once security with speech is established there is a corresponding relief from stuttering.

These are just typical examples of the varied problems found with young stutterers. From our experiences with them we conclude that most stutterers would go through only a phase of stuttering in the preschool period, if parents had a clearer understanding of the implication of stuttering. So often the child is forced to focus his attention on his defective speech, and the state of anxiety which results not only increases his tendency to stutter but may even set the stuttering pattern for life.

Just 100 years ago this year the first medical degree granted a woman in the United States was awarded to Dr. Elizabeth Blackwell; in 1948, out of a total of 5,543 medical graduates, 392 were women.

RARE RENAL RUPTURES

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THE purpose of this paper is to report two rare cases of renal injuries; spontaneous rupture of a hydronephrosis and traumatic rupture of a congenital solitary kidney.

Uncomplicated rupture of the kidney of such severity that operation is considered is seen relatively infrequently and, therefore, no one surgeon sees a large number. At this hospital over the past ten years there have been recorded 8 cases of renal injury in 6,924 urological admissions.

Of these cases, 7 showed gross hæmaturia and one microscopic blood. Shock was present in two of the cases; one a ruptured kidney and spleen and the second a ruptured kidney with fractured ribs and hæmothorax. There was one death, the case with associated rupture of the spleen. Of the 5 remaining cases with gross hæmaturia, this sign persisted from three to ten days. Pratt at Charity Hospital, New Orleans reports 21 cases in 20 years; Stellwagen, Jefferson Hospital, Philadelphia reports 22 cases in 14 years. Campbell, Bellevue Hospital, New York City, 52 cases and Pilcher, Mayo Clinic, 45 cases in 24 years.

The automobile is probably the greatest causative agent to be followed by sports and falls in that order. Often precious hours are lost in the traumatic cases since accompanying injuries tend to divert one's attention from the kidney. Since hæmaturia is present in over 90% of renal injuries, a routine examination of the urine is essential in all accidents. After hæmaturia has directed one's attention to the urinary tract, its origin is not difficult to determine.

The normal kidney may be ruptured by a blow, fall or crushing force, the degree of the kidney damage, however, bearing no direct relationship to the degree of force applied. The force may act directly on the kidney through the intact abdominal wall, or the kidney may be caught between the lower ribs in front and the resistant spine behind. With the kidney normally engorged with blood the sudden, increased hydraulic pressure causes a bursting of the kidney. A diseased kidney is more liable to injury than a normal one, *e.g.*, polycystic kidney, hydronephrosis, etc. A history

of a blow in the flank followed by pain and hæmaturia indicates injury to the kidney.

Shock may be present when patient is first seen and is then due to the trauma rather than to loss of blood. Shock occurring several hours later is due to hæmorrhage and will produce the usual signs and symptoms — progressive anæmia, fall in blood pressure, increased pulse rate, thirst, pallor, sweating and restlessness. The presence, or absence, of early shock is not indicative of the degree of renal damage.

A raised blood pressure occurs in some cases of ruptured kidney and returns to normal after some days. This pressor effect is not dependent on the formation of a perirenal hæmatoma. The only clinical application is that if the blood pressure is raised it rules out associated injuries such as ruptured spleen.

Hæmaturia is present in over 90% of cases. The presence or absence of blood in the urine is no criterion of the existence or the degree of renal damage. In complete or multiple fractures, hæmaturia may be insignificant, as the blood passes out into the perirenal space. Hæmaturia may be absent if the fracture line does not enter the pelvis, if the ureter be torn across or if the renal vessels are ruptured.

Examination usually demonstrates marked tenderness in the C.V.A. and tenderness and splinting of the affected flank and the upper abdomen. If the patient is distended there may be slight generalized abdominal tenderness. Abdominal distension may be marked following the injury and is due to a reflex paralytic ileus. This distension may make it difficult to rule out ruptured viscus. There may be a hæmoperitoneum without damage to intraperitoneal organs.

Abdominal x-ray, excretory urography or cystoscopic examination and retrograde pyelography are helpful aids. The flat abdominal x-ray will show fracture of the ribs or transverse processes, the presence or absence of air under the diaphragm or multiple intestinal fluid levels as seen in ileus. The intravenous urogram is the most valuable single aid. Extravasation or irregular filling of calyces may be noted. Occasionally the kidney does not secrete. The demonstration of a normal functioning kidney on the opposite side is important. Retrograde pyelograms are perhaps justified if the intravenous urogram is not diagnostic. The danger of infection is great. Sodium

iodide is not used since it is very irritating if extravasation present.

The vast majority of less severe injuries heal spontaneously with bed rest, sedation and general supportive measures. Since there is a danger of late hæmorrhage patient should be kept in bed for 10 days following cessation of bleeding and activity restricted for a further period of 10 to 14 days. Hæmorrhage due to secondary infection may occur one month after injury. Hæmorrhage is no guide to the degree of kidney damage. Shock, if present, must be adequately treated. A careful watch is kept on blood pressure and pulse. Clinical indications for immediate operation are persistent hæmorrhage and sepsis. The former is recognized by the usual signs and symptoms of persistent hæmorrhage with the appearance of or an increase in size of a tumour in the renal region. Sepsis is indicated by a moderate or high temperature, leucocytosis and increased pain.

An exploratory operation is advocated by some writers for any patient who has hæmaturia for more than 24 hours, in the belief that evacuation of blood clots and production of hæmostasis will be followed by less destruction than is the case if the injury be treated without operation. A large subcapsular hæmorrhage is best treated surgically since removal of the clot would tend to minimize the scarring incident to healing. Surgical exploration is necessary for complete fracture involving pelvis, parenchyma and capsule. The perinephric hæmatoma is removed and the kidney may or may not be removed.

Laceration of the renal vessels is usually fatal. Ligation of the pedicle and nephrectomy offers the only hope. The upper ureter is carefully inspected in all cases where the kidney is left in. Where the ureter is torn across associated renal damage usually necessitates nephrectomy, otherwise anastomosis of the ureter is feasible. The lumbar approach is best in the majority of cases.

All cases heal by fibrosis and the injured parenchyma is replaced by fibrous tissue. There is always some loss of functioning tissue and frequently one or more major calyces may be obliterated. Where a large perirenal hæmatoma becomes organized rather than absorbed there is a thickening of the fatty or true capsule with resultant compression of the parenchyma. This may explain renal hypertension occurring following renal injury. In-

fection may produce a late perinephric abscess requiring immediate drainage.

Renal calculi are said to occur relatively more frequently in traumatized kidneys. Hydronephrosis may be a late end result due to stricture of upper ureter as a result of scarring.

Spontaneous rupture occurs in a kidney already damaged by disease in which there is no history of trauma. A report in 1946 describes 43 cases in the literature. The following is a short résumé of one such case.

T.K., aged 19 years, male. Admitted to hospital because of terminal hæmaturia. While in bed in hospital he developed severe pain in left flank and costovertebral angle. This was followed by high fever, leucocytosis, local tenderness and rigidity, abdominal distension and x-ray signs of a perinephric abscess. Subsequent operation disclosed a perinephric extravasation of urine and

blood from a large hydronephrotic kidney which was little more than a shell. The rupture was in the greatly enlarged pelvis of the kidney. Simple drainage and nephrostomy was done followed subsequently by nephrectomy. A more detailed outline is not possible since the chart of the case is now a part of army records.

Congenital absence of one kidney is said to occur in 0.1 to 0.04 of autopsies. The solitary kidney is more commonly on the right and is usually in the normal position. Males predominate. In a small percentage of cases some trace of the opposite ureter may be found. In our group of five cases seen at this hospital in the past five months the solitary kidney was present on the right side and in its normal position. In all five cases there was complete absence of the opposite ureter and in four cases the left half of the trigone was not developed. There were three males and two females.

TABLE I.

Author and date	Sex and age	Occupation	Side of kidney	Nature of accident	Nature and time of operation	Day of death (after accident)	Notes
1. Melchior (Germany) 1928	M. 27	Doctor	L	Motor accident	1. Laparotomy 2. Nephrectomy day after accident	5th	On admission general condition good. Bruising left flank. Bladder contained pure blood; next day worse. Laparotomy showed no intraperitoneal injury. Hæmorrhage around left kidney. Wound closed. Lumbar nephrectomy kidney showed deep transverse cut into hilum.
2. Speer (U.S.A.) 1929	M. 27	?	L	Motor accident	Nephrectomy soon after admission	2nd	Conscious on admission. Also fracture left femur. Very shocked, but improved a little, so operation. Kidney showed complete tear into pelvis and vein.
3. Brattström (Sweden) 1932	F. 16	Schoolgirl	L	Kicked by horse	Nephrectomy soon after admission	3rd	On admission bladder full of pure blood. Condition rapidly deteriorated, so operation performed. Kidney found to be pulped. At post mortem, no ureter or suprarenal present and uterus bifid.
4. Thompson (Ireland) 1932	M. 22	?	L	Kicked in loin at football	Nephrectomy several days after accident	10th after operation	Patient watched for some days, first at home and then in hospital before the persistence of pain and bleeding demanded operation. Left kidney showed deep cut into pelvis and was "hopelessly" damaged.
5. Turton and Williamson (England) 1932	M. 12	Schoolboy	L	Fell about 5 feet off gate on to left flank	Drainage of retroperitoneal extravasation 11th day	11th	Expectant treatment at first and patient improved, but then became worse. Developed mass in left loin. Drainage decided upon. Heart and respiration stopped at finish of operation.
6. Duckworth (Canada) 1948	M. 46	Painter	R	Fell 8 feet off scaffold striking right flank on edge of ladder.	None	.....	Conservative therapy (see case report).

Traumatic rupture of a congenital solitary kidney is indeed rare. Five cases only are found in the literature though a number of cases have been reported in which nephrectomy has been performed for neoplasm or disease of the kidney which proved later—at post mortem—to be of the congenital solitary type. To the five reported cases of traumatic rupture is added a sixth.

G.J., male, aged 48 years. On November 28, 1947, patient fell from scaffold about 8 feet high striking his right flank on the edge of an upturned ladder. He complained of severe pain locally and was brought to St. Michael's Hospital.

On admission (1 p.m.).—Pale. No air hunger. Blood pressure 132/80. Pulse 80, good volume. No evidence of shock. Ecchymosis over 10th rib in right mid-axillary line. No pain on antero-posterior compression of thoracic cage. Lungs clear. Abdomen moved slightly with respiration. Marked tenderness in right costovertebral angle and flank with splinting of entire right abdomen. No mass could be palpated. No sign of shifting dullness. Abdomen tympanitic except in right flank. Voided urine very bloody; 8.30 p.m., blood pressure and pulse satisfactory. Heart irregular with many extra systoles. Abdomen distended and tense. No evidence of intra-peritoneal free fluid. Vomiting. Urine darker red. Wangenstein drainage set up.

November 29.—Blood pressure 120/80. Pulse 76 (occasional dropped beat). Abdominal distension less. No pain. Belching considerable gas. Wangenstein drainage discontinued. Abdomen tympanitic except over right upper flank. Still marked splinting of right abdomen.

November 30.—Blood pressure and pulse satisfactory. Wangenstein drainage re-started previous night because of increasing distension and vomiting. Abdomen softer this a.m. Area of dullness in right flank. Urine dark red. Hbg. 80%.

December 1.—Blood pressure 120/80. Pulse 76. Temperature 98.3°. Urea 13 mgm. %. Abdomen distended and tympanitic.

December 2.—Wangenstein discontinued. Taking fluids *per os*. Abdomen softer. Urine almost clear. Urea 15 mgm. %.

December 3.—Taking fluids well. Given soft diet. Voided urine clear. Abdomen soft.

December 3 to 8.—Continued improvement. Urine remained clear. Intravenous urography on December 8 showed good secretion and excretion of dye on the right. The lower half of the right kidney was normal, the upper half not clearly seen. Left renal outline not seen. No evidence of excretion of dye on the left.

December 13.—Patient had glandular hypospadias with tight meatus. This was dilated to 26° F. Bladder observation showed absence of the left half of the trigone and the left ureteral orifice. The right orifice was normal and functioning—clear urine. Indigo carmine of good concentration appeared in three minutes on the right. There was no evidence of an ectopic left orifice.

December 15.—Up and around with no complaints. Urine clear.

December 17.—Developed an aching pain in the right flank and gross hæmaturia. Examination disclosed slight tenderness in the right costovertebral angle. Neither kidney nor a mass was palpable. Blood pressure normal. Patient returned to bed rest.

He was discharged well on December 31. The following April cystoscopy was again performed and showed the same findings as above. Right pyelogram normal.

In the first five cases the diagnosis of ruptured kidney was correct but the work up was incomplete. In none of these cases was intra-

venous urography done. This would appear to be the best method possible of determining the degree of renal injury and of surely demonstrating the presence or absence of a functioning kidney on the opposite side. When the condition of the patient is such that intravenous urography is not possible, the peritoneum must be opened and palpation of the opposite renal fossa and below should be done before nephrectomy.

If a congenital solitary kidney is damaged and surgery is necessary every effort must be made to control hæmorrhage by conservative suturing or partial nephrectomy.

CONCLUSIONS

1. Uncomplicated rupture of the kidney of such severity that operation is considered is seen relatively infrequently.
2. The automobile and sports are the greatest causative agents.
3. Diseased kidneys are more prone to rupture than healthy ones.
4. Rupture may be produced by apparently mild trauma.
5. Hæmorrhage, localized loin pain and tenderness, and splinting are the commonest symptoms.
6. Palpation and intravenous urography are the best diagnostic aids. Retrograde pyelography usually unnecessary and undesirable except when additional information is essential.
7. The presence or absence and the degree of hæmaturia are no criteria of the severity of renal damage.
8. Persisting or increasing hæmaturia or infection are indications for surgery. Urinary extravasation indicates severe renal injury and is felt to be a specific indication for operation.
9. The presence or absence of a contralateral kidney should be confirmed.

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TRAGEDIES FOLLOWING THE TREATMENT OF VARICOSE VEINS*

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THIS report has been prepared to stress the tragedies which may occur as the result of treatment of varicose veins, and can occur to anyone, the highly skilled or the inexperienced.

Numerous tests have been employed in the diagnosis of varicose veins, Trendelenburg, Perthes, etc. It is evident to many physicians that the performance and interpretation of these tests appear to be too formidable an undertaking, and require too much time. As accurate diagnosis in ligation cases is so essential, I would like first to describe a simplified test, which can be readily performed as a simple office procedure.

Technique.—The affected limb is elevated and the veins emptied by gravity. A tourniquet is then applied around the upper thigh sufficiently tight to constrict the saphenous, but not the femoral vein. The patient then stands upright and the degree of filling of the saphenous is noted with tourniquet in place and again with the tourniquet released.

Interpretation negative.—A negative test is one, which with the tourniquet in place, the veins fill within a period of 30 seconds, and upon removal of tourniquet, no increased filling is noted. Here it is apparent there is no retrograde flow taking place at sapheno-femoral junction.

Positive.—When patient stands with tourniquet in place, the varicosities will remain collapsed for 30 seconds, but when tourniquet is released, the veins rapidly fill with blood from above, due to incompetent valves at sapheno-femoral junction.

Injection treatment alone became popular around 1930. At first, very irritant sclerosing solutions were used. But even as injecting solutions were improved, the incidence of no improvement or so frequent recurrences, demanded a more radical treatment, so that in recent years the operation of high ligation and retrograde injections, became the method of choice, and still is, in those cases of varicose veins showing evidence of retrograde flow. Unfortunately it is the belief of many that this is a simple, easily carried out procedure free from hazard. That this procedure is not free from disasters and that unfortunate results are occurring all too frequently and in increasing numbers, should make all those carrying out the treatment of varicose veins, very conscious of its potential dangers.

* Read before the Woodstock Medical Society, November 26, 1948.

These dangers mainly are: (a) *Hæmorrhage.*—The operation of ligation of the great saphenous may be difficult in obese individuals, which is frequently aggravated by a thinned-out varix, near the terminal portion. If due to phlebitis, firm adhesions are present. The varix is easily torn or one of the large branches escapes ligation. It should be appreciated that very little pressure is required to stop the flow of blood, but at the moment the unexpected severity of hæmorrhage upsets the calm of the surgeon and uncontrolled clamping results in injury to deep femoral vein, artery or nerve. A case illustrating this was operated on by a skilled surgeon in charge of varicose vein clinic in a teaching school. The patient bled to death. After such an accident it was easy to point out how hæmorrhage could have been safely controlled by use of packing and pressure, but these emergencies occur quickly and the surgeon usually makes every effort to arrest hæmorrhage by clamping the bleeding point.

(b) *Arterial spasm.*—This has frequently caused complete occlusion of the artery. A young woman recently underwent ligation and injection of the saphenous (high). Immediately the vein was injected, severe pain occurred throughout the leg with blanching. Subsequent gangrene necessitated mid-thigh amputation.

Arterial spasm may result from simple injection without ligation. In a recent case, following the injection of a varicosity at the junction of middle and lower third of leg, after a minimal amount of solution had been injected, the patient complained of severe pain in the toes, with blanching of the foot. Subsequent gangrene developed, which was limited to the loss of three toes, besides severe pain and being incapacitated for many months.

(c) *Embolus.*—A young woman suddenly died at home, a week after ligation and injection, presumably from an embolus. A number of cases have now accumulated.

Against the facts, we must admit that ligation and injection offer the best results. How then, can one avoid trouble? Compared to the number of varicose veins treated, the percentage of disasters may be small, and give the surgeon a feeling of safety, but to those surgeons who have experienced these cases, I am sure the percentage might as well be 100%.

The following suggestions may help one to avoid tragedies:

1. Adequate operating room equipment and assistance. The surgeon must be familiar with the anatomy of the saphenous vein particularly its branches and surrounding structures. Dissection must be very carefully performed. On incision of the skin, one should feel for pulsation of the femoral artery for adequate orientation. If the main vein is torn, avoid blind clamping, hæmorrhage can easily be controlled by finger or packing.

2. In a large series of cases thrombotic accidents all occurred in patients who did not walk until 12 hours after operation. It is suggested local anæsthesia be used and patient walk immediately.

3. Experience (largely) now shows that ligation alone should be carried out, with later injections once a week until varicosities are obliterated.

4. Embolism may be largely avoided by having patient walk immediately after operation and for 15 minutes every hour, with active dorsi and plantar flexion of the foot.

5. Arterial spasm: this may occur in injection following ligation, or probably more important, following injection treatment alone. One should be alert to recognize the symptoms, which are very characteristic, in that the patient immediately, even after a very minimal amount of solution has been injected, complains of severe and intense pain, particularly in the toes, with blanching of foot and if more severe, the whole leg. Here, one should immediately attempt to block transmission of sympathetic motor nerve impulses, which cause vasospasm by their constricting action.

This can usually be accomplished by the prompt administration of etamon chloride. An intramuscular injection of 10 c.c. produces an effective sympathetic block for 6 to 8 hours. When it must be repeated, patient should be hospitalized and the surgeon should be thoroughly familiar with its administration and possible reactions. Early administration is important before devitalization has taken place, beginning in the toes.

In some cases reported of gangrene of the toes, it was not given for twenty-four or forty-eight hours, or even longer, when irreparable damage had already taken place. Had a sympathetic block been obtained earlier, with

resultant increase in arterial circulation, it is not unreasonable to assume, that these toes may have been saved. Probably, if it is limited, the loss of toes is not such a great tragedy, but as early amputation (as a hurry-up process) is usually contra-indicated, it results in the patient being incapacitated for many months.

SUMMARY

1. Hæmorrhage may be controlled by pressure, finger or packing. Avoid blind clamping in attempt to find bleeding point.

2. Ligation to be performed under local anæsthesia, patient to walk immediately after operation.

3. At operation, ligation alone, to be performed, with later weekly injections to obliterate varicosities.

4. Embolism may be largely avoided by having patient walk immediately after operation, and for fifteen minutes every hour.

5. Arterial spasm: Recognize symptoms at once, and immediately institute adequate treatment, in an attempt to cause interruption of sympathetic nerve stimuli.

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CASE REPORTS

PROGRESSIVE MESENTERIC CIRCULATORY INSUFFICIENCY

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It is not often that one is able to observe a patient progressing toward severe mesenteric circulatory insufficiency. As more or less continued observation was possible in this case, it is felt worth while to report.

On November 21, 1947, a woman of 75 years presented herself, complaining of pains in the back of the neck, some shortness of breath on exertion, occasional pounding of the heart, aching pain across the lower dorsal region, some heartburn two or three hours p.e., and a generalized tendency to fatigue.

Her past history is not relevant except that on a hospital admission in November of 1944 for a gynecological complaint, the medical consultant found her blood pressure to be 210/100, and made the following diagnoses: aortic valvular sclerosis, hypertension and early congestive failure.

On examination on November 25, 1947, her blood pressure was 190/100, pulse was 90, regular in rhythm; there were numerous râles at both bases; there was some apparent enlargement of her heart, an accentuated aortic 2nd sound, apical and basal systolic murmurs of moderate intensity and some moderate œdema above the ankles. Her urinalysis showed a specific gravity of 1.012 but was otherwise negative. It was considered that the patient was suffering from hypertensive cardiovascular disease and that some cardiac decompensation was present. She was sent home to bed and given digitoxin.

On December 4, she was seen again. She complained that the previous night she felt somewhat "bilious" at suppertime and that during the evening she noticed her heart beating forcefully. This was accompanied by a hot feeling in her neck and arms and a tight feeling in her chest, as if the two breasts were meeting. She also complained of some pain in the left side of the abdomen and under the right costal margin. Her blood pressure was 190/110. The examination was not significantly different except that she showed some tenderness over the descending colon at the level of the umbilicus.

As she had considerable distress in the next few days in the nature of palpitation, loss of appetite and strength, and pains in her abdomen on the left side and under the right costal margin, together with some gas, it was thought advisable to admit her for further study to the Royal Victoria Hospital. She was admitted on December 9.

The following reports were the results of the investigation:

Chest x-ray.—Heart not enlarged. Somewhat tortuous aorta with calcification. Generalized increase in the broncho-vascular markings.

Barium enema.—Diverticulosis of the colon. Diverticulitis in the sigmoid region.

Gall bladder x-rays were indicative of cholelithiasis.

Barium drink.—Stomach and duodenum negative. Studies of the small bowel made at 2, 4 and 6 hours showed "beyond question an abnormal pattern of both jejunum and ileum. There is marked segmentation here and there with a clump of barium suggesting that the mucosa of the small bowel is somewhat œdematous."

Blood.—Non-protein nitrogen 17 mgm. %, sugars a.c. 121 and p.c. 113 mgm. %. Hæmoglobin 87%. Sedimentation rate 37.

Electrocardiogram.—Left axis deviation. Depression RS-T in Leads 1, 2 and 4f.

Toward the end of her stay in hospital, the patient began to feel more tired and weak. On December 21, she was nauseated and vomited. She was sent home on December 22, feeling fairly well. On December 23 she felt more nauseated and vomited some bile-stained fluid. On December 24 she was seen in the evening. She felt weak, had vomited several times and complained of pounding of her heart. Her heart showed a varying rate, at times regular around 84 and at other times regular about 120. She showed the usual amount of moisture at the bases. Her abdomen was soft and not tender or distended. On December 25, she was given 1,000 c.c. of 5% dextrose in saline. Her nausea was relieved and she felt much better that day and was able to take considerable fluid by mouth. She was seen again the following morning. She had had several loose stools and was again somewhat nauseated. During that day the character of her stools began to change. They were loose but appeared bloody. In the evening she was complaining of severe crampy pains in the left lower quadrant. She appeared much weaker. Her blood pressure had dropped to around 100 systolic from 160 in the morning and her pulse was of small volume at about 110. Her abdomen was now quite distended and very definitely tender in the lower half but particularly on the left side. Her stools were of pea soup consistency but definitely bloody in appearance and she was passing some stool every few minutes.

A tentative diagnosis of mesenteric thrombosis was made and the patient was readmitted. Rectal examina-

tion did not add further information. The surgical consultant who saw her felt that the diagnosis lay between mesenteric thrombosis and diverticulitis with surrounding peritonitis. It was felt that her cardiovascular system was so poor that in any case exploration could not be done. Distension persisted, the patient became comatose and finally expired due to failing circulation early on the afternoon of December 27.

Pathological findings.—Amongst the pathological diagnoses made after autopsy were the following: Acute enterocolitis (jejunum, ileum and colon), hæmorrhagic. Acute fibrinous peritonitis (minimal). Diverticulosis and diverticulitis of colon. Generalized arteriosclerosis, moderate. Arteriosclerosis and stenosis of coronary arteries, severe. Chronic cholelithiasis and cholecystitis. Chronic passive congestion of the liver, nutmeg moderate. Thrombosis of mesenteric vessels, small, three. Atrophy of kidneys, bilateral.

The following is the description of the gross appearance of the gastro-intestinal tract at autopsy: the œsophagus is not unusual. The stomach is greatly distended and filled with air and a large quantity of greyish-black grumous material. The duodenum is bile-stained but not unusually dilated; it shows no lesions. On the serosal surface the whole small intestine and large intestine have a rather bluish to purple discoloration. This is most marked over the jejunum where there is also a marked dilation of the bowel. Scattered here and there on the serosal surface are small areas which appear to have a rather greenish colour and to which more fibrin is adherent than in other areas. The mucosa of the jejunum is stained a rather dark brownish-black colour throughout. The mucosa although apparently well preserved shows no lesion. In the ileum several Peyer's patches appear to have tiny pinhead ulcerations and portions of the ileum are in a contracted state. The remainder are in a more dilated state. The bowel wall in the region of the jejunum is very thin but in the ileum it is somewhat thicker and has a pinker colour than that seen in the jejunum. The colon feels rather thick throughout. However, the thickness of the wall is contributed to mostly by fat. The external surface is dark pink in colour, has some hæmorrhagic areas which are small and irregular. Upon the external surface diverticula can also be seen to penetrate some of the appendices epiploicæ. On opening the colon the mucosa is quite red, with pinpoint and pinhead hæmorrhages throughout. There is no actual ulceration of the mucosa. This appearance extends down to the proximal portion of the rectum. Also visible on the mucosal surface are the orifices of numerous diverticula which can be traced outwards into the appendices. Some of these appear to have some inflammatory reaction around their stomata although this is not very marked. It should be mentioned that on removing the gut two or three pieces of thrombus material came out of the smaller blood vessels at the edge of the mesentery. It cannot be ascertained whether or not these came from veins or small arteries.

The microscopic appearance of the vessels of the mesentery is summarized as follows: the small arteries appear thickened, with a prominent quite dense adventitia, a thick media, in which there are vacuolated areas between the muscle fibres, replacing some and containing pale pink fluid material and amorphous fragments of irregular tissue-like inclusions. The internal elastica is prominent and in some appears hyaline and swollen. The intima is not very much altered save by the presence of some of the above material encroaching on it. In some places there is irregular subintimal deposit. The endothelial cells appear plump and somewhat hyperplastic. In the adventitia which is quite dense in some arteries, there are patches of a swelling of collagen and fibrinoid necrosis, with a few polymorphonuclears, lymphocytes and the odd mononuclear cell. In several other arteries of a smaller order of size there appears to be more acute disorganization of the media, with increased eosinophilia and loss of detail in the cytoplasm of the muscle cells. The muscle cell nuclei appear hypertrophied and rounder.

Discussion.—This case presented a considerable number of various pathological processes. The condition of the liver, the gallstones and the extensive diverticulosis might all play their part in producing gastrointestinal symptoms. However, in view of the progress of the case, and of the termination, one cannot but feel that the failing circulation played a decisive part in the production of the symptoms, and in the death of the patient. It would seem probable that circulation through the mesenteric vessels was in a precarious state on the arterial side, due to sclerosis and on the venous side due to a probable increase of portal pressure even at the time of the barium drink (December 18, 1947) and that this was manifested in the abnormal appearance of the small bowel at that time. Probably this pattern represented an oedematous state as suggested by the radiologist. Further deterioration must have been occurring rapidly during the next week. Finally, failure of the mesenteric circulation reached the critical point and became inadequate about the morning of the day before her death. Haemorrhagic oedema of the bowel developed, manifested by pain, bloody diarrhoea and shock. The ensuing low blood pressure led to further circulatory insufficiency and death occurred.

It would seem that many patients with heart failure of various types must be bordering on such a state at times, and that many of their gastro-intestinal symptoms and nutritional difficulties must depend on mesenteric circulatory insufficiency.

320 Medical Arts Building.

A CASE OF PULMONARY EMBOLUS

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Miss P.T., an unmarried female doing housework, was admitted to the Victoria Hospital, Prince Albert, on July 7, 1948.

In 1947 this young woman came to me for removal of an embarrassingly large clitoris. The general configuration of her body was male in type. She had a deep full chest, wide shoulders, narrow hips, rudimentary breasts and the body hair distribution was typically male. At that time she had been having recurrent bouts of lower right abdominal pain for some years and it was deemed advisable to also remove her appendix. This was done. A pelvic examination while the abdomen was open revealed an apparently normal left ovary, a small infantile uterus and the absence of any ovary on the right side. The vagina was small, admitting only one finger, but otherwise normal. The clitoris measured approximately one and one-half inches in length and three-

quarters of an inch in diameter in the flaccid state, had very well developed glands but no urethra. In an otherwise normal vulva the urethra opened in the usual manner.

Subsequent to her operation she developed rheumatic complaints associated with some sinus trouble and was referred to Dr. E. A. Shaw for consultation. He reported cloudy antra and some tonsillar tags remaining from a previous tonsillectomy many years before. Therefore she was admitted on this present occasion to have the tonsillar tags removed and the antra drained. The general examination at this time revealed no other disease.

In Prince Albert we have no specialist anaesthetist, so give anaesthetics for each other. As this girl was my patient originally, on the morning of Thursday, July 8, I undertook to give her gas and ether anaesthetic, the same anaesthetic which she had had for her previous operation. Her preoperative medication consisted of morphine gr. 1/6 with atropine gr. 1/150 by hypo. She went to sleep quietly under the nitrous oxide and oxygen and her colour was maintained well at all times. At the commencement of the ether inhalation there was some spasm of the larynx which was not noteworthy and which subsided without any real embarrassment. On switching over to the usual ether suction machine, when she was in the early third stage of anaesthesia, she suddenly stopped breathing. Her colour remained good, however, and some time was lost in introducing an airway and in making sure that her respiratory passages were patent. Artificial respiration was then begun by Dr. Shaw while the artificial respiration machine was brought from another part of the hospital. By this time her pulse was unobtainable anywhere and her heart could not be heard with the stethoscope. At this moment an associate, Dr. M. F. Savisky, entered the operating room to speak to me about another matter and I had the nurses give him a pair of sterile gloves and sterile scalpel and quickly paint the patient's abdomen. Dr. Savisky made an upper midline incision through the abdominal wall and, inserting his hand, massaged the heart through the diaphragm while I maintained the artificial respiration. Meanwhile I injected adrenalin into the heart with no response. After a moment or two of massage the heart commenced to beat, although fibrillating, and some five minutes later spontaneous respiration returned. Within an hour the heart had returned to a regular rate although it remained rapid at about 120 beats to the minute.

On returning the patient to the ward continuous oxygen was administered through a nasal catheter for twelve hours, after which she continued without it. She was given 500 c.c. of plasma and 1,000 c.c. of saline solution intravenously during the course of the day and another 1,000 c.c. of saline solution during the night. Her blood pressure through the course of the day remained about 130/110 and a retaining catheter was left in the bladder. She was given coramine 1 c.c. on several occasions when her pulse appeared to waver and she had frequent generalized convulsive seizures until she died suddenly about 9.30 a.m. on July 10. She had never regained consciousness. During the last twenty-four hours her fluid balance was maintained with intravenous saline and glucose. Her temperature rose to 102° on the first afternoon, dropped to normal the following morning and then rose terminally to over 105°.

PATHOLOGICAL REPORT

Brain.—The external surface did not reveal anything remarkable. Serial sections through the cerebellum, brain stem, basal nuclei and cortex did not reveal any evidence of haemorrhage or softening. The ventricular systems appeared normal.

Lung (two sections).—The first section appeared to be from the apex. It was of a feathery consistency and measured 9.0 x 10.0 x 1.5 cm. The second portion felt much heavier and was of a darker colour. On the visceral pleural aspect an area of softening was felt. On serial cross section an area of necrosis, which ex-

tended from the centre of the lung tissue to the pleural surface but which did not involve the pleura, was revealed. It measured 10.0 cm. in length and had an average diameter of 2.0 cm. On exploring the pulmonary artery 1.0 cm. of the artery was occluded by what appeared to be thrombus material.

Heart.—On the septal aspect anteriorly a subepicardial hæmorrhage, 5.5 x 2.0 cm., was present. There was nothing else remarkable on the surface. All the chambers were of normal size. The right ventricle contained a small quantity of post-mortem clot. The valves and valve orifices were not remarkable. In the septal muscle, close to the area of surface hæmorrhage, there was evidence of hæmorrhage into the myocardium. The coronary arteries were not remarkable.

Microscopic: brain.—Sections from the pineal gland showed evidence of congestion and œdema with an occasional petechial hæmorrhage in the cerebral cortex, basal ganglia, substantia nigra, pons and brain stem. Degenerative changes were noted in the Purkinje cells of the cerebellum, some of which had partially disintegrated and others had completely disappeared. The nerve cells of the cerebral cortex in places were shrunken and had more than normal eosinophilic staining. This probably represented post-mortem change.

Lung.—One section showed dilatation of alveoli. Two other sections taken from the edge of the infarcted area showed congested lung tissue merging into necrotic tissue containing breaking down red blood cells and alveoli. The vessels were filled with red blood cells but no thrombi were seen. In addition marked œdema was found in the vicinity about the infarct and there was an influx of polymorphonuclears indicative of early pneumonic change. The infarct appeared to be of about forty-eight hours' duration. Post-mortem autolysis was also evident. No thrombus material was found in the pulmonary arteries.

Ovary.—Sections of ovary showed practically the whole organ to be replaced by a tumour process. In one area groups of cells resembling interstitial cells of the testis were seen lying in angles between shadows of atrophic obliterated structures resembling seminiferous tubules. In these tubules cells resembling Sertoli cells were seen. Other areas showed large cells resembling those seen in a dysgerminoma but accompanying small cells were not typical of the latter tumour. Instead they were irregularly fusiform with a variable arrangement in tangled sheets, vaguely plexiform cords and frequently were characterized by the development of pseudoacinar or tubular structures containing more or less translucent eosinophilic material. Occasionally this latter substance was being attacked by macrophages and multinucleated foreign body giant cells. Throughout this small tumour there was a striking lack of mitotic figures and no evidence of an aggressive attempt to break through the peripheral shell of atrophic ovarian stroma. Recognizable ovarian stroma was scanty and almost entirely confined to the peripheral zones whereas the main bulk of the tumour was irregularly compartmented by coarse fibrous connective tissue septa with further fine subdivisions by delicate fibrous bands.

Comment.—From a study of the specimens submitted it was suggested that, at the time of operation, a small pulmonary embolism occurred which was responsible for the infarct described. It was likely that the brain damage took place during the next forty-eight hours and that the terminal event was a massive pulmonary embolism which may have slipped out of the vessel at the time of autopsy.

"The ovarian tumour had probably been present since before puberty and accounted for the pseudo-hermaphroditism."

The terminal event then was obviously a massive pulmonary embolus, but we felt, wrongly as it turned out, that the first death, if I may be permitted to speak of it as such, was an anæ-

sthetic death pure and simple. It was strange that a girl who had had two previous ether anæsthetics should suddenly succumb to ether on the third attempt. The length of time between the first death and the reactivating of the heart may well have been something over five minutes, everyone being too occupied with the emergency for accurate timing, and I felt that sufficient brain damage had occurred during that time to account for the continuing unconsciousness and the convulsive seizures.

I think the most interesting feature about this case is that a pulmonary embolus occurred in a vigorous young woman who had virtually walked in from the street, had a normal night's rest in bed, was transferred to the operating room and had a pulmonary embolus! A similar case occurred, oddly enough, in the same hospital only two or three weeks previous to this. A young woman was admitted for teeth extraction and within twenty-four hours developed a massive pulmonary embolus and died.

We think of pulmonary emboli as a sequelæ of confinement to bed over periods of time, usually seven to fourteen days, during which time stasis occurs in the leg veins to a point where non-inflammatory clotting occurs within the vessels. In fact it is this conception which has led to the modern idea of getting surgical patients particularly, out of bed and having them move about as early as possible. In view of such an experience as this one is inclined to doubt the value of this procedure and to wonder if it is worthwhile to push it; at least in the face of any contraindication. It would appear that we have much to learn as yet about the phenomenon of pulmonary embolus.

THROMBOCYTOPENIC PURPURA FOLLOWING QUINIDINE THERAPY

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Thrombocytopenic purpura may follow exposure to benzene and as an unusual complication following therapy with various drugs, including organic arsenicals, sulfonamides, phenobarbital, dinitrophenol, ergot, and quinine.¹ This case is similar in some respects to the two previously reported instances of purpura following quinidine therapy^{2, 3} and illustrates the extreme sensitivity that may result.

E.H., a white housewife aged 35, was admitted August 8, 1948, complaining of a petechial rash and bleeding from the gums, of six hours' duration. She had had scarlet fever as a child, and frequent bouts of palpitation characterized by sudden onset, regular rate, and abrupt ending, since a thyroidectomy 17 years before entry. All female relatives were said to bruise and to bleed easily, and the patient had previously had severe hemorrhages following dental extractions.

Five days before admission she had an attack of palpitation, associated with pallor and faintness. This lasted about two hours and subsided spontaneously before a physician could be seen. Two similar attacks occurred the following day; during the second of these an electrocardiogram taken elsewhere was said to show a rate of 80 with alternating ventricular extrasystoles. She was given quinidine, gr. iii (0.2 gm.) every three hours, and continued on this dosage until entry. On the morning of admission she began menstruating, and noticed that the flow was considerably more copious than normal. About breakfast-time she noted oozing from the gums, and at about 10 a.m. petechiae began appearing on her face and over her trunk.

On admission at 3 p.m. she was seen to be very lethargic. Numerous petechiae were apparent in the sclerae and in the skin of the face, upper trunk, and upper extremities. These measured about 2 mm. in diameter, were sharply circumscribed, did not blanch, and were flush with the surrounding skin. There was crusted blood in the nose, blood oozing from the gum margins, and moderate vaginal bleeding. Apart from a blood pressure of 160/110, the physical examination was normal.

There were 4,900,000 erythrocytes, and 8,300 leukocytes, with 88% neutrophils, 11% lymphocytes and 1% eosinophiles. The sedimentation rate, corrected for hematocrit, was 22 mm. per hour. No platelets were seen on several stained smears. The bleeding time was

6 min., clotting time 9½ min., prothrombin time 17 sec., and Rumpel-Leede test positive.

She was given testosterone to inhibit the menstrual flow, and vitamins C and K, and rutin. By the following morning the bleeding from the gums had stopped and no new petechiae had appeared. The Rumpel-Leede test was negative. In four days the platelet count had risen to 140,000 and in a week to 210,000. She felt weak and was moderately somnolent for five days, and had several attacks of syncope during this period, without, however, alteration in her heart rate, which remained at 100 without subjective palpitation, during her hospital stay.

On the ninth hospital day, to determine the rôle of quinidine in her illness, she was given gr. ¼ (15 mgm.) of the drug. Both clinically and in the laboratory the response was dramatic. From a previous level of 240,000 the platelets dropped within one-half hour to 90,000 and in four hours to less than 5,000 per c.mm. The bleeding time, which before quinidine was 2 min., had risen to 7 min. in two hours; and from three to almost six hours following administration she bled continuously from a needle-puncture wound. Four and one-half hours after the drug was given her gums began to bleed spontaneously, petechiae appeared, the Rumpel-Leede test became positive, and she became somnolent. The following morning the bleeding from the gums had ceased, the bleeding time was 5 min., and the platelet count, 170,000.

COMMENT

The bleeding tendency in this patient was well established before any drug was administered, but she had never had spontaneous bleeding until quinidine therapy was begun for her cardiac arrhythmia. The effect of the

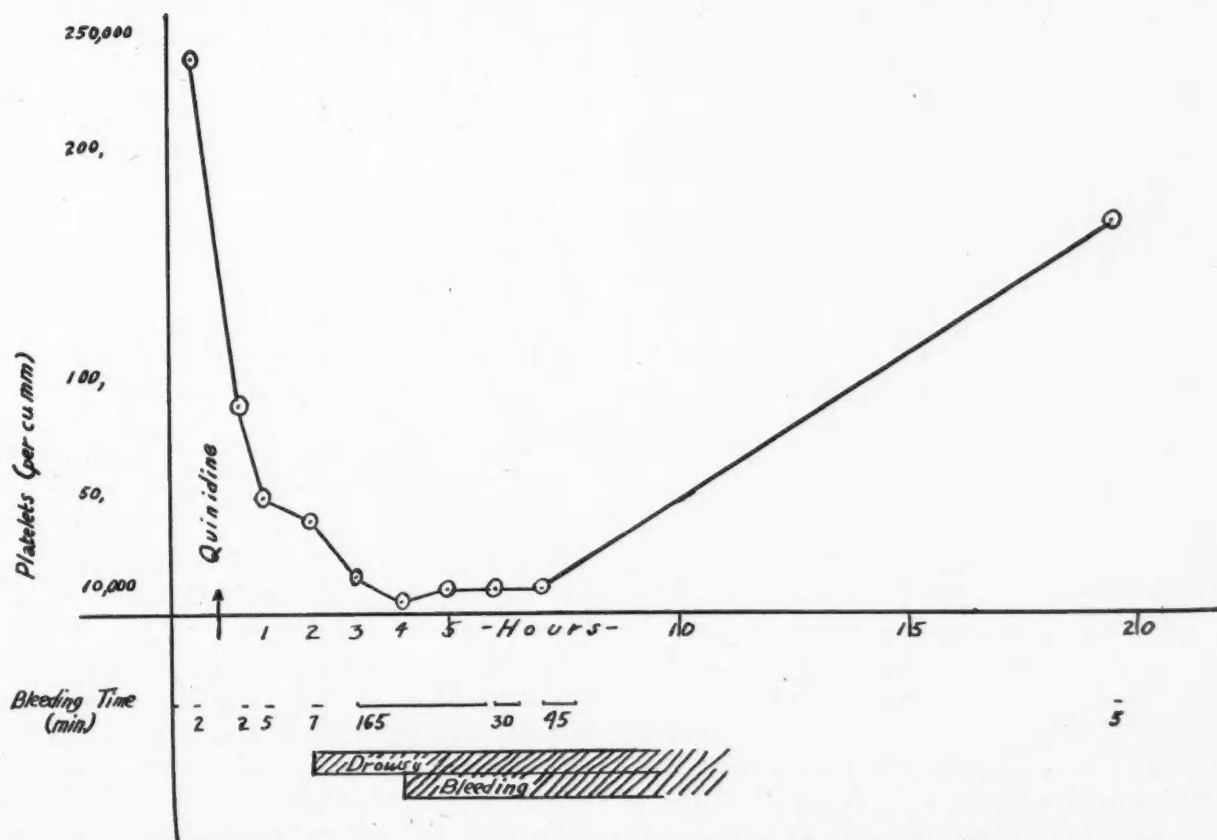


Fig. 1.—The reproduction of the thrombocytopenia syndrome by administration of 15 mgm. of quinidine. The dose caused a precipitous drop in the platelet count, prolongation of the bleeding time, drowsiness, and spontaneous purpura and bleeding from the gums.

quinidine was probably twofold; on capillary fragility, as well as on platelet destruction, since the Rumpel-Leede test for capillary fragility was positive, and she bled spontaneously into regions of minimum trauma (scleræ and face). The association with menstruation was apparently accidental, since the disease was reproduced after the menstrual flow had ceased and the onset of menstruation had been on the expected date.

SUMMARY

A case of thrombocytopenic purpura due to quinidine therapy is presented. Symptoms appeared after 3 gm. of the drug had been administered, and were reproduced by a test dose of 15 mgm. Recovery was spontaneous.

My thanks are due Dr. M. Aronovitch for permission to report this case.

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DIVERTICULUM OF THE FEMALE URETHRA WITH MULTIPLE CALCULI

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Historically, diverticulum of the female urethra was first observed by William Hey in 1786. Although less than 200 such cases have been noted since that time, it is not a rare condition. With improved diagnostic procedures and awareness of the lesion, more cases are being reported, and undoubtedly many more are being observed and not reported.

Etiology.—From a comprehensive review of the literature, there is as yet no conclusive proof as to the etiology of all diverticula. The subject remains highly controversial. However, most authors believe that the diverticula are acquired and only rarely are congenital. The former arise secondarily to urethral strictures, passage of calculi, instrumentation, trauma of childbearing or infection of the urethral glands. In an original study, McKenzie and Beck have shown that the proximal third of the female urethra is devoid of important glandular structures. This lends credence to

the acquired hypothesis, since the majority of diverticula occur in the floor of the middle third of the urethra where urethral glands are abundant. Multiple diverticula have been reported occasionally; calculi have been found in approximately 17% of all cases reported.

The congenital variety originate from Gaertner's duct, the Wolffian duct, cell rests, faulty union of the primary folds in the midline or congenital vaginal cysts. Should a remnant of the cloacal duct persist in adult life, a urethral diverticulum or urethrodiverticulovaginal fistula would result, with the diverticular orifice opening into the proximal portion of the urethra. Vaginal cysts which become infected suppurate and communicate with the urethra, due to the structural weakness of the latter as compared with that of the vesicovaginal diaphragm. Consequently, the diverticula which occur in the proximal third of the urethra, in which there are no important glandular structures, are to be considered as congenital in origin; all other diverticula are acquired, with trauma and infection as the two main predisposing causes. Diverticula with multiple orifices are extremely rare. Veit reported such a case having two orifices leading into the urethra, and suggested its origin from Gaertner's duct. This lends substance to the contention that the case to be presented, also found to have two orifices draining the one diverticulum, is of congenital origin.

Pathology.—Pathologically, the majority of diverticula are false, consisting primarily of chronic inflammatory constituents. In many cases there is a metaplasia of the lining membrane from transitional cell epithelium to non-keratinized, stratified squamous epithelium due to the presence of infection; this is especially so where calculi are found. Associated upper urinary involvement, when present, is due to an ascending extension of the infection.

Symptoms.—Symptomatology depends on the presence of infection and the ability of the diverticulum to empty itself or be emptied. The commonest subjective urinary complaints are urgency and frequency of micturition, dysuria and hæmaturia. Dyspareunia is often the presenting symptom. Incontinence depends upon the location of the diverticulum with respect to the poorly defined external sphincter of the female urethra. Those distal to the sphincter will be manifested by the

dribbling of the contents of the diverticulum; those proximal will be continent.

Diagnosis.—The diagnosis is suspected by vaginal examination when a mass is found anteriorly and purulent fluid is expressed from the urethral meatus by pressure on the mass. If calculi are present, crepitations can easily be elicited. The diverticular orifice can best be visualized with a panendoscope and the diverticulum can be demonstrated by catheterization or by urethro-cystogram. A flat x-ray will reveal calculi as a shadow super-imposed on the pubic bones below the level of the superior surface of the symphysis pubis.

Treatment.—There are various methods of treatment which can be grouped into the non-surgical and surgical. Some patients can be taught to evacuate the diverticulum after voiding by manual expression and thereby obtain relief. Periodic dilatation and urethral irrigations are adjuncts to this type of palliative therapy. Some cases are simply treated with a sclerosing solution which can obliterate small diverticula. However, the procedure of choice is the surgical excision of the diverticulum by the vaginal approach. There are many variations to this type of radical surgery but all specify amputation of the sac with closure of the diverticular orifice. A urethral catheter is left indwelling to sidetrack the urine. Great care must be taken to prevent injury to the sphincter as the latter is in close relationship with the majority of the diverticula. Conservative surgery, such as enlargement of the diverticular orifice to promote better drainage, can be utilized for patients who are considered as poor surgical risks. The results of radical excision of the lesion are good; recurrence and fistula formation are rare.

We are reporting the following case for three reasons, firstly, to discuss the pathogenesis of the diverticulum, secondly, because of the unusual configuration of the diverticulum with its two orifices, and thirdly, to discuss the problem of the surgical treatment.

A 60-year old, white female was admitted to the Jewish General Hospital on September 29, 1947. Nine years previously, she had been investigated at another hospital for acute retention and was discharged five weeks later apparently cured. She had had urinary frequency for several years and one episode of gross hæmaturia in 1945. Four days prior to admission to hospital, she experienced another episode of gross hæmaturia associated with marked urgency, frequency and burning on micturition.

The patient was a mild hypertensive with cardiac enlargement but no evidence of decompensation. Vari-

cosities of the lower extremities were evident bilaterally. There was marked suprapubic tenderness and a mass could be palpated *per vaginam* in the anterior wall along the urethra. Crepitations were elicited within the mass. The urethral meatus was reddened and oedematous.

Urinalysis showed many pus and red blood cells and a pH in excess of 7.5. The admission urine revealed a Gram-positive coccus. Blood chemistry was within normal limits. Temperature and pulse were normal. At endoscopic examination, the instrument was introduced into the bladder with ease, there was no grating and no obstruction was encountered. The bladder capacity was markedly diminished and the mucosa appeared inflamed throughout. Normal landmarks could not be identified. A cystogram revealed a small contracted bladder, bilateral ureteral reflux and three irregular shadows superimposed on the pubic bones (Fig. 1). Intravenous pyelography disclosed a normal pyelogram on the right, hydronephrosis and hydroureter on the left with the same shadows over the symphysis pubis. The diagnosis of multiple diverticula with calculi was made.

It was thought advisable to institute therapy to clear up the bladder infection prior to surgical intervention. Accordingly, the patient was put on continuous bladder

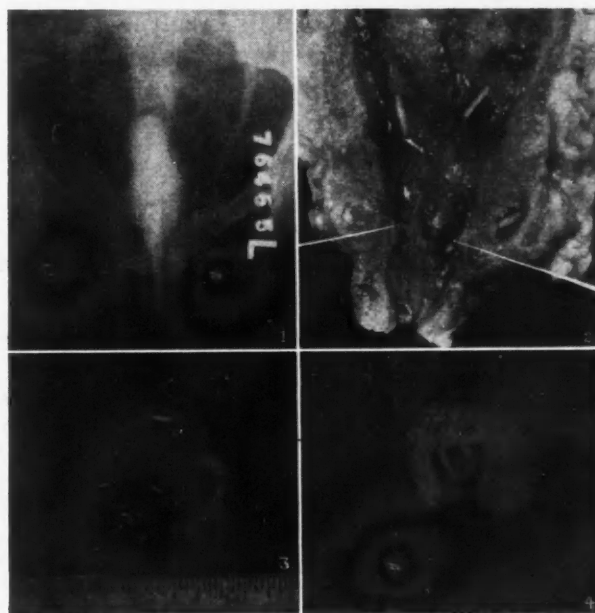


Fig. 1.—Cystogram showing the contracted bladder, bilateral ureteral reflux and irregular shadows superimposed on the pubic bones. **Fig. 2.**—Photograph of the specimen which has been incised longitudinally to reveal the floor of the urethra. Markers indicate the two diverticular orifices. **Fig. 3.**—Photograph of the calculi showing the formation in which they were originally found in the diverticulum. **Fig. 4.**—Post-mortem x-ray of the reconstructed diverticulum filled with barium shows how it encircled the urethra. Glass rod represents the urethra.

lavage with $\frac{1}{4}$ of 1% phosphoric acid and was given penicillin parenterally. This was continued for six days, at the end of which time the urine cleared considerably and the pH fell to 6.2. Unfortunately, on Sunday, October 12, 1947, the patient suddenly became dyspnoeic, cyanotic and expired in a few minutes.

At necropsy, the cause of death was found to be a large pulmonary embolus which had occluded both pulmonary arteries. The bladder mucosa was markedly inflamed throughout and a large diverticular orifice, with a calculus protruding from it, was found in the posterior third of the urethra. A second, much smaller, diverticular opening was found proximal and to the right of the first (Fig. 2). The original diagnosis of multiple diverticula was incorrect in that only one diverticulum which completely encircled the urethra was present. The diverticulum was found to contain four calcium carbonate

calculi (Fig. 3). Post-mortem x-ray of the reconstructed diverticulum filled with barium shows how it encircled the urethra (Fig. 4).

Discussion. — In view of the fact that the diverticulum completely encircled the urethra, and that the diverticular orifices occurred in the posterior third of the urethra, it was felt that this represented a congenital diverticulum of the female urethra with multiple calculi. The interpretation of its pathogenesis is of interest. It is obvious that it must have arisen from some bilateral vestigial ducts because of the two diverticular orifices. This requisite is fulfilled by the Wolffian apparatus which normally disappears entirely in the female. However, should the most caudal portion persist, it would end in the proximal segment of the urogenital sinus much like the vas deferens does in the male. Thus the potential elements exist which, with superimposed trauma and infection, may result in outpouchings and subsequent diverticulum formation.

Following the discovery of this unusual type of diverticulum, we were most interested in its surgical approach. Accordingly, we attempted to remove the diverticulum post-mortem. It was obvious from the start that a complete removal was impossible, either *per vaginam* or retropubically or both, because of the extensive scarring and the intimate association of the urethra to the diverticulum. In endeavouring to free one from the other, no line of cleavage could be found resulting in a tear of the urethral wall. We then proceeded to remove the calculi *per urethram* by enlarging the diverticular orifices; the two smaller but not the two larger stones were readily extracted. We were convinced that had we had the opportunity to operate on this patient by any of the approaches mentioned above, the roof and lateral walls of the urethra would have been severely injured. Consequently, should a similar case present itself in the future, no attempt will be made to remove the diverticulum, but rather to, firstly, incise it retropubically and extract the calculi and, secondly, enlarge the diverticular orifices to ensure adequate drainage. The question of sclerosing fluid would be considered at this time.

SUMMARY

1. A case of congenital diverticulum of the female urethra with multiple calculi is reported.

2. The pathogenesis and treatment of the lesion are discussed.

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MITRAL STENOSIS ASSOCIATED WITH LEFT RECURRENT NERVE PARALYSIS

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The association of paralysis of the left vocal cord and cardiac disease has been reported as an occasional occurrence since Ortnier¹ called attention to its presence in two cases of mitral stenosis in 1897. The following case is reported as one in which the left vocal cord paralysis was present in a patient with the typical findings of mitral stenosis.

Miss A.B., was admitted to the University Hospital on March 20, 1948, complaining of hoarseness, weakness and palpitation for two years. She gave a history of recurrent attacks of joint pain from the age of 17 to 20 and was diagnosed as having rheumatic heart disease two years before admission. Hoarseness developed insidiously without any history of respiratory infection. The only previous illness of interest was occasional sore throat.

Examination on admission showed orthopnea with cyanosis of the lips and fingers. The voice was faint and hoarse. The temperature was normal. The pulse was 80 and regular. The blood pressure was 110/76. When first seen the neck veins were swollen. Physical examination of the heart showed no enlargement. A loud pre-systolic murmur was present at the apex. The lungs were clear. There was no clinical evidence of hepatic or splenic enlargement. No petechiae were present. Laboratory investigation showed negative urinary findings, a normal blood picture, a sedimentation rate of 9 mm. in one hour (Cutler), and a negative blood Kahn test.

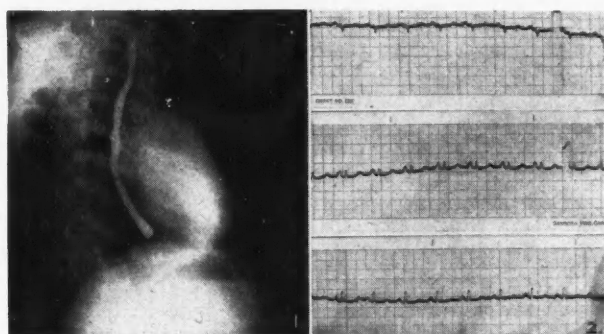
Roentgenological study of the chest by fluoroscopic examination and films taken in the antero-posterior and right anterior-oblique projection showed enlargement of the left auricle to the left and posteriorly. Following the swallowing of barium the left auricle was found to displace the oesophagus and to encroach on the retro-cardiac space. The hilar shadows were enlarged and the pulmonary vascular pattern was accentuated (Fig. 1). The arm to tongue circulation time was 20 seconds and the venous pressure was 90 mm. The electrocardiogram showed low voltage in the limb leads and CF, with inversion of QRS. The P waves were tall and notched in lead 2 and inverted in CF, (Fig. 2).

Laryngoscopic examination by Dr. W. D. S. Armstrong was reported on as follows: "The base of the tongue, the epiglottic area and the epiglottic folds were normal. The false cords were normal in colour. The left vocal cord was completely paralyzed in abduction and did not move on phonation."

A diagnosis of rheumatic heart disease with mitral stenosis and early congestive failure was made. The patient was digitalized with digitoxin. During her three weeks' stay in hospital she showed subjective improvement but with no roentgenological change in the appearance of the heart or lungs. The hoarseness persisted.

DISCUSSION

The existence of a causal relationship between mitral stenosis and left recurrent laryngeal paralysis has been disputed. It has been pointed out that mitral stenosis is a relatively common condition and is very rarely complicated by left laryngeal palsy. Reiche² reported 300 cases of mitral stenosis in only two of which vocal cord paralysis was present.



However, Scheifley and Smith³ point out that mitral stenosis was ten times as frequent in a series of cases of left recurrent nerve palsy as in a control group. The mechanism of production of the left vocal cord paralysis is still a matter of conjecture.

Ortner, in his original description which was supported by autopsy findings, believed that the left recurrent laryngeal nerve was compressed between the left atrium and the left bronchus, or between the left atrium and the arch of the aorta. It is more reasonable, however, to suppose that the pressure exerted on the nerve is brought about by the hypertrophied left pulmonary artery pressing upwards on the left recurrent laryngeal nerve and compressing it between the aortic arch and the fibrous remnant of the ductus arteriosus (Fig. 3).

Dolowitz and Lewis⁵ reported two cases with anatomical studies on fresh and fixed cadavers. They found small lymph nodes at the triangle

made up by the aortic arch, the ligamentum arteriosum and the pulmonary artery, through which the left recurrent laryngeal nerve passes. These authors postulate that "hypertrophy of a strategically placed lymph node can cause the fixation of the left recurrent laryngeal nerve"; the resulting fixation of the nerve allowing pressure to be more adequately applied to the nerve.

Left recurrent laryngeal nerve paralysis is occasionally a complication of left ventricular failure. King, Hitzig and Fishberg⁶ reported three such cases which at autopsy showed no significant anatomic dilatation of the pulmonary artery. They advance the theory that the compression resulted from "dynamic dilatation of the pulmonary artery due to the engorgement of the lesser circuit engendered by

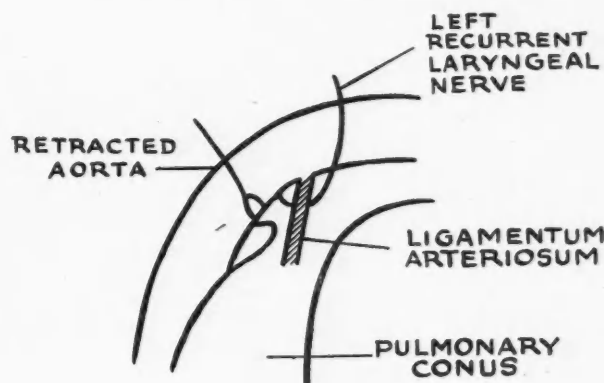


Fig. 3

failure of the left ventricle", and suggests that the same mechanism may play a part in the left recurrent nerve palsy of mitral stenosis.

A review of the cases reported in the literature leads us to the conclusion that there is a causal relationship between mitral stenosis and paralysis of the left recurrent laryngeal nerve. The cause of the paralysis is believed to be due to the compression of the left recurrent laryngeal nerve between the hypertrophied left pulmonary artery, the aortic arch and the ductus arteriosus.

SUMMARY

The case history of a patient with rheumatic heart disease and well established mitral stenosis accompanied by left recurrent laryngeal nerve paralysis has been reported.

The possibility of a causal relationship between mitral stenosis and left recurrent laryngeal nerve palsy has been advanced.

The mechanism of production of such a nerve lesion has been discussed.

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SPECIAL ARTICLE

THE CANADIAN NURSES'
ASSOCIATION'S DEMONSTRATION
SCHOOL OF NURSING

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The history of this project dates from 1944, but the conditions which led up to it have been developing for about one hundred years. The present system of nursing education in Canada is based on the school which was established by the Nightingale Committee in 1860 in association with St. Thomas' Hospital in London, though that model was very imperfectly understood and interpreted till recently. At that time nursing was a very much simpler thing than it is today, and the supposed copies of the original model functioned fairly satisfactorily for some time.

At the beginning of this century it was recognized that the system was beginning to break down, both as to results in hospital nursing service and as a preparation for the new field of public health nursing. Attempts to bolster it up took first the form of postgraduate courses in universities to prepare instructors and public health nurses, and these have led to the establishment of university schools for nursing giving both a liberal education and the basic preparation for the whole field of nursing. A little later the need to supplement the work of the professional nurse by that of an auxiliary group was evident, and a training for the nursing assistant was organized, and is in operation on a small scale in most of the provinces.

There remained the great intermediary group of nurses giving bedside care in hospitals and homes; those coming from the traditional three-year hospital schools. These are responsible for by far the greatest part of nursing care, and it is the conclusion of the nursing profession that in Canada they will continue to be so, at least for a long time.

University schools of nursing here cannot begin to produce the numbers required, and there appears to be no reason for wanting them to do so. The profession welcomes the help of the nursing assistants: but there is no indication so far that large numbers are going to be attracted into this group, nor are we willing to hand over to them the entire responsibility for nursing care.

THE MAIN PROBLEM

We are still confronted then with the problem of preparing large numbers of clinical nurses, and it is here that the present educational system has been most unsatisfactory. In the opinion of many nurses who have given the matter long thought, this is due to the fact that most nursing schools have been created not as educational institutions but as money-saving devices. Nearly all nursing schools are private schools, owned and administered by hospital boards. It is often frankly taken for granted, and admitted, that the object in conducting the school is to obtain a supply of cheap and relatively stable nursing service from the "students". There is no attempt to distinguish between the differing purposes of a hospital and a school. So complete is the confusion of these two different institutions that, in discussion, the school often seems to be quite indistinguishable from the nursing service. In such a situation, when a conflict, which should not exist, is allowed to arise between the needs of patients and the needs of students, it is naturally the latter which are pushed aside. The problem is further complicated by the great amount of work on the wards, not all of it nursing, which is demanded from nurses. In the meantime the student carries on her double job in a state of great tension, and of gradually diminishing enthusiasm for nursing. With all the freely-expressed dissatisfactions of various groups with the nursing situation, it does not seem to be realized that nurses themselves, both student and graduate, are far from satisfied. Much publicity has been given to their economic and personal problems, which are relatively minor in most of their minds: but their chief dissatisfaction comes from the frustration of not being able to give satisfactory nursing care to their patients. Young women enter the nursing field with great enthusiasm, but they are increasingly tending to leave it, or to remain with a rather cynical attitude toward it.

These were the problems confronting the Canadian Nurses' Association in 1944, when a demonstration of shorter training was proposed at a biennial meeting. There was agreement here that the Association should take the lead in reforming this system. The problem however was largely a financial one. In discussing this it was recalled that at the close of the former World War the Canadian Red Cross Society had subsidized an experiment in nurs-

ing education, namely the training of nurses for the new field of public health: and it was decided to find out whether the Red Cross could be interested in making possible a new demonstration. After preliminary negotiations, a joint meeting of the Canadian Red Cross Society and the Canadian Nurses' Association was held, at which representatives from all nine provincial nursing associations were present; and there was agreement on general principles. A report explaining the plan more fully and estimating its expense was prepared and forwarded to the Red Cross. In the fall of 1946 the Red Cross granted \$40,000.00 a year for four years to the Canadian Nurses' Association, to demonstrate the proposed school. At this time the Red Cross Society made it very clear that it was not entering the field of nursing education in Canada. Full responsibility for the school was to be accepted by the Canadian Nurses' Association.

The Canadian Nurses' Association proceeded to formulate general policies and to initiate the experiment. The provinces were asked to send in immediately the names of places which they thought might be suitable as sites for the school. Only three provinces had places which they wished to suggest.

THE PLAN

The plan proposed was: (1) To ask the hospital to make financial arrangements for the nursing care of its patients, using graduate nurses and auxiliary workers, employed and paid for this service. (2) To ask nursing schools to find an income and then to conduct their schools as educational institutions.

In actual practice, for the demonstration, it was planned to ask the hospital to hand over its existing residence or school building for the term of the experiment, during which the school would maintain it and conduct the school in it.

The immediate objectives of the experiment were defined as follows: (1) To establish a nursing school as an educational institution, a separate entity in its own right. This meant that the school would have financial and administrative independence, which, in turn, would give it educational control, including control over the use of its students' time. (2) To demonstrate, if possible, that a skilled clinical nurse can be prepared in a period shorter than three years, *once the school is given control of its students' time.*

Although the students would continue to practise nursing on the wards of the hospital, the school and the students would be freed from their present responsibility of maintaining the nursing service of the hospital at all times and in all departments. The hospital would, at the request of the school, make its wards available for student practice to the extent asked

for by the school, as long as the school accepted responsibility for the safety of this service. As the student practice would certainly provide some nursing service, the hospital was to be asked to make a payment to the school for this.

From January to August, 1947, nineteen visits were paid to eleven hospitals in the provinces of Manitoba, Quebec and Ontario. In the hospitals which were found fairly suitable in themselves, two main problems were encountered: (1) The financial problem of replacing the student service by graduate and auxiliary service. (2) The discontinuing of the existing school.

Neither of these were absolutely insurmountable, but their solution would have occasioned considerable delay in starting the school. The Metropolitan Hospital at Windsor had never had a nursing school, though it had considered one from time to time. They undertook to build a combined residence and teaching unit, and in the meantime to buy and convert a house in which a small group could be started. The sum arranged for student practice was \$200.00 per student per year.

THE SCHOOL

The School opened on January 19, 1948, with 13 students from five provinces, 12 of whom were finally accepted into the School. These students have completed their pre-clinical term and their first experience in medical and surgical nursing, and are now having psychiatric experience at the Ontario Hospital, London, Ont. A second group of 24 students, again representing five provinces, was admitted on September 13, 1948. These students are now having their first clinical experience in the hospital. The school building, beside the hospital, is under way, and it is hoped that it will be completed early this summer.

As this is a national experiment, supported by two national associations, acceptances are distributed through the provinces from which applications come. The student must be 18 years old, as this is a legal requirement in Ontario, and in good health. The educational requirement is University entrance in the province from which the student comes. A report on the applicant is obtained from the high school principal and from a nurse.

The application is accompanied by a report stating that the applicant has been examined by a physician and testifying to her general good health, and by a dental certificate. When the student registers in the first year she must bring with her a report of recent immunization against smallpox and typhoid fever; also of recent testing for susceptibility to diphtheria and scarlet fever, and immunization against these if the individual is susceptible. During the course physical examinations are done annually, unless indicated more frequently.

X-ray examinations of the chest are made at the opening of each term and at six months' intervals thereafter. Every effort is made to protect the health of the student and prevent disease. There is a school physician. If illness of slight nature occurs, the student is cared for in the school residence. If continued medical care or hospitalization is required, the student is responsible for the cost. All our present students are insured under Blue Cross or other hospitalization plans. In the protection of the student's health, diet, the residence regimen, and perhaps above all the control of the student's working time, are considered important.

THE CURRICULUM

This is of course highly tentative, and will undergo considerable modification during the experiment. At present it is based on a period of twenty-five months, and it is expected that this will be sufficient, though so far applicants are told that it may take a little longer. The experience is as follows: a pre-clinical term (science and nursing) of 3 months; medical nursing (including nutrition) 4 months; surgery (including operating room) 4 months; psychiatry 3 months; obstetrics and pædiatrics 4 months; public health, communicable disease and tuberculosis 1 month each; further surgery 1 month; ward administration 1 month; vacation 2 months.

The various experiences are of course not segregated as rigidly as this time-table would imply. Mental hygiene, nutrition and preventive medicine, while taught directly at stated times, are associated at all times with the subject of nursing and nursing practice. Sociology is not taught as a separate course, but the social aspects of nursing are emphasized throughout the total course. The constant emphasis on preventive medicine or public health is made for several reasons: for the student's own health, because it is necessary for good bedside nursing, and because there must be a sufficient foundation if some students should later decide to study public health nursing. The course, however, is a preparation for bedside nursing.

Practice in nursing in medical and surgical wards is indicated at particular periods, but it must be noted that almost every other hospital service (*e.g.*, pædiatrics, obstetrics, tuberculosis, psychiatry) provides continued practice in medicine, in surgery, or in both.

The graduate of the school will be prepared for the general practice of clinical nursing. She is eligible, if successful in the examinations, for registration in the province of Ontario, and therefore for registration by reciprocity in the other provinces. It has been established also that she is eligible for post-graduate work in the nursing schools of the

universities of Alberta, McGill, Queen's and Toronto, and there is little doubt that she will be considered so by the others. It may be of interest to record that the first group have successfully passed Part I of the Registration examination for which ordinarily the student sits at the end of the first year in training, but which was written by these students at the end of eight months.

PROBLEMS FOR SOLUTION

It was stated earlier that one of the fundamental purposes was to demonstrate that more satisfactory nurses can be produced when the nursing school is a school in the sense that that term is understood in other fields of education, and particularly when the student is recognized as such. This would hardly seem to be a matter for argument; but tradition does seem to make the demonstration of this form of organization of the school necessary.

The purpose of having it however is to obtain the necessary freedom for research on the curriculum. The purpose here is to find the most economical method, in every sense of the term, by which adequate clinical nurses can be prepared. That is to say, we wish to find the necessary costs of a nursing school; but we wish also to produce nurses who are in good health, who are developing personalities, and who like nursing and want to nurse. As to the ideal length of the course, all we know at present is that if the supposed content of the three year course was satisfactory, it can be given in less than three years, since much of that three years was spent otherwise than in learning nursing.

Assuming that this new system of nursing education is found to be satisfactory, there is the problem of financial support for similar schools, and for this one at the end of the four-year demonstration period. The three possible sources of income for any school are endowment, subsidy and student fees. Endowment is unlikely; student fees cannot and should not provide more than a small part of the cost. At the Metropolitan School students pay fifty dollars a year for tuition, travelling expenses for affiliation, and the cost of uniforms and some books. The total cost is about \$250.00 for the entire course. Maintenance is provided by the school. It is possible that students may have to take more financial responsibility for their own education than they do here; but this would presumably be, as in the case of students in other educational fields, responsibility for their own maintenance. Student nurses should not be expected to support the school, as in fact they have been doing, in large measure, through their services.

The source of income for nearly all other schools is the state. What other source is there for nursing education?

THE CANADIAN MEDICAL ASSOCIATION

Editorial Offices—3640 University Street, Montreal

(Information regarding contributions and advertising will be found on the second page following the reading material.)

EDITORIAL

WHY DOES THE TUBERCULOUS PATIENT LEAVE HOSPITAL TOO SOON?

EVERY institution for the treatment of tuberculosis has to face the problem of patients abandoning their treatment before their physicians think it advisable. A recent study in veterans' hospitals in the United States shows that 54.4% of discharges of tuberculous patients in 1947 were "irregular", that is, without medical sanction. Two years previously the rate had been as high as 72.5%. These perhaps are unusually high figures but the problem exists in every similar institution, in varying degree. No other disease presents the same difficulty. The explanation therefore must be sought in the nature of tuberculosis itself, and a study by Dr. W. B. Tollen (VA Pamphlet 10-27 Washington 25, D.C.) brings out interesting aspects of the question. There are the peculiar characteristics of tuberculosis themselves; the absence of specific or permanent cure, the long period of treatment, the prolonged rest; in fact, all the evils derived from its chronicity. There seems to be no agreement as to whether the tuberculous patient is a peculiar species or not, but there is little to show that the mature and emotionally stable personality will be affected by tuberculosis in any specific manner. Less stable types will be affected as they would be by any crisis. And therefore the emotional and psychic aspects rank very high as factors. In the case of veterans the distaste for restrictions developed by army experience had some effect, but in other respects tuberculous veterans are not different from civilian cases. When all is said and done the socio-economic aspect of tuberculosis is the most important of all. Osler's apophthegm "Tuberculosis is a social problem with a medical aspect" leaves little to be said except to repeat it in expanded form. The wonder is that the economic and social strain produced by sanatorium life does not interrupt treatment more often than it does. The social worker's evaluation of the various aspects

showed that a basic cause of irregular discharge in 43% of cases was the pressure of factors originating outside the hospital and related to the patient's personal, social and economic status. The veterans themselves on questioning assigned these factors to 54% of cases.

The prevention of irregular discharge of tuberculous patients then begins at the moment that the diagnosis is made. From then on the psychological aspect must be continually kept in mind and dealt with, and along with it, equally early, the social worker must exercise her function in guarding against the potential causes of irregular discharge.

EDITORIAL COMMENTS

A New Approach to the Training of Nurses

More than one reason is given for the shortage of nurses. But whatever else may contribute to it the method of teaching nursing must be at the root of the matter. The training of nurses generally presents nowadays an anomaly not found in connection with any other profession. Who else in the course of their studies contributes so much time and labour to the service of the institution in which they are learning their profession? Granted that the student nurse in the hospital school has been freed of the menial labour of her predecessors, she still is obliged to carry on some of the work of the hospital in addition to her technical acquirements. She has dual interests, a state of distraction in which her own training is bound to suffer in some degree.

With this in mind the Canadian Nursing Association after long study has set up a school at which it is intended to demonstrate that nursing can be taught satisfactorily, in some respects more so, by being treated as is any other form of study. Miss Helen McArthur in this issue writes an excellently clear account of this demonstration school, which is now in full operation at Windsor, Ont. The school has been working for only a little more than a year, but already has given evidence to suggest that not only can nurses be trained adequately, in an independent school, but it can be done in a shorter time than is required in hospital training schools. How far the best type of nursing can be thus developed remains to be seen. There is a difficulty in adjusting time-tables too rigidly to training for care of the sick whether in medicine or nursing. However, this attempt to deal with so complex and urgent a problem deserves our sympathetic consideration an encouragement.

The obstacles of administration and finance are shown to be formidable. The Red Cross has provided aid for a period of four years but after that other means of financing the work must be found. The hospitals cannot be expected to take up the strain which will come on them with the withdrawal of the support they now depend on. Indeed this venture in teaching of nursing opens up deeply-lying economic effects which must eventually be dealt with by some degree of state aid.

Vitamin E

Apart from the papers by Shute and his co-workers, there has been a noticeable absence of clinical evidence to support the claims made for the value of vitamin E in the treatment of cardiovascular disease. On the other hand, several papers have appeared in which negative results are reported. In Britain, for example, Makinson, Oleesky and Stone¹ could find no therapeutic value in vitamin E in the treatment of a series of 22 patients with angina pectoris. Similar studies were carried out by Levy and Boas,² of New York, in a series of 13 cases of heart disease, and also in a group of 22 by Baer, Heine and Gelfond,³ of Philadelphia. More recently still, Ravin and Katz⁴ in Boston, and Donegan, Messer and Ruffin⁵ at Duke University, have treated other groups of these patients with vitamin E, using large doses over extended periods, and, as in the case of the other series mentioned, following the patient's electrocardiographic changes and clinical progress.

No appreciable benefit, either subjectively or objectively, has resulted from the use of vitamin E in any of these cases.

Claims have also been made that vitamin E is of value in diabetes mellitus. Here again there is a lack of clinical confirmation. A carefully controlled study has been in progress for some months at a large hospital diabetic clinic in Montreal, but nothing has yet been found to show that this vitamin is of any particular benefit to the diabetic.⁶ We understand that studies along these lines have been carried out in other hospitals, with similar negative results.

It is possible that even longer periods of observation are necessary for the full investigation of the clinical value of vitamin E but certainly little has been found to encourage expectations.

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MEN and BOOKS

MEDICAL SERVICES IN THE NORTH-WEST REBELLION OF 1885*

Ross Mitchell, M.D.

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A genius for improvisation and an ability to rise to the occasion have been characteristic of Canadians. When boatmen were needed to aid in the ascent of the rapids of the Nile in 1884 in an attempt to save General Gordon, the British War Office turned to the voyageurs of Canada. In the past war when more tunnels were needed at Gibraltar the War Office called on Canadian hardrock miners. In World War I the Canadian Corps found its greatest leader in a Canadian, Sir Arthur Currie, whose military experience previous to that war had been only in the militia, and when McGill University after the war needed a Principal, they found him in the same Corps leader who had little academic training. In both world wars Canadian troops, drawn from civilian walks of life, were the spearhead of the attack. This capacity for meeting the demands of the situation was likewise shown in the medical services in the North-West Rebellion of 1885. At the end of the campaign there was praise for the medical services though older administrative branches came in for sharp criticism.

A sample of this criticism is seen in a letter written by Dr. Francis J. Shepherd, Professor of Anatomy at McGill, to his brother Sheringham. On April 12, 1885, he wrote:

"Roddick has gone away in charge of the medical department of the army of the Saskatchewan and this has thrown some extra work on my hands. What a muddle that business was! It found the government altogether unprepared, although they had ample warning for months beforehand, and everyone knew of it in Manitoba. I pity the poor volunteers in the west, so badly equipped and having to undergo such an altogether different treatment and experience from what they are used to. The ranks are chiefly filled with young boys, mostly substituting for older men. The appointments have been mostly political and are hence jobs. Caron, the minister, is perfectly dazed and can do nothing on his own responsibility. The country and the climate I fancy, will be the soldier's greatest enemy. I do not believe for a moment that the insurgents will show fight. . . ."

Dr. Shepherd erred in thinking that the insurgents would not show fight. Under their leader Gabriel Dumont, the French Metis proved to be stubborn and resourceful fighters. Hunting the buffalo, which had been largely their means of subsistence, was excellent training for prairie warfare. Both the Metis and their Indian allies were skilled horsemen and marksmen. The construction and arrangement of the rifle pits at Batoche drew praise from the

* Read at the Seventy-ninth Annual Meeting of the Canadian Medical Association, Section of Historical Medicine, Toronto, June 24, 1948.

British general, Sir Frederick Middleton, who commanded the Canadian forces.

The late Sir Sam Steele, leader of Steele's Scouts in 1885, wrote of Gabriel Dumont that he was a remarkable Metis who with careful and just treatment might have been educated to become one of the most loyal citizens of Canada. His good qualities far outweighed his bad and he was a man whom many leading white men were glad to call friend. In 1875 he set up a sort of provisional government on the banks of the South Saskatchewan and claimed independence of Canada. Major-General Sir E. Selby-Smith, G.O.C. of the militia, who was on an inspection tour of the North-West and British Columbia met Gabriel at Batoche's crossing and had a conference with him which resulted in clearing the air.

The Metis had grievances, some imaginary and some real. If these had been carefully investigated and properly dealt with, there would have been no uprising in 1885, with its widespread terror, loss of property and even more costly, the loss of valuable lives. The course of action of the federal government may be judged by the fact that its leader was called "Old Tomorrow". In 1885 the Saskatchewan country was as far removed from Ottawa as Outer Mongolia is today. When no heed was paid to their memorials to the Dominion Government the Metis recalled from Montana Louis Riel, who in 1870 had set up a provisional government at the Red River colony. During the winter of 1884-85 meetings of settlers were held, peaceful at first, but becoming more and more threatening. On March 17, Louis "David" Riel, as that paranoic visionary then called himself, set up a North-West Council at Batoche and began to seize arms and ammunition from trading posts and stores. On March 26, a force of 100 North-West Mounted Police under Sgt. Crozier, aided by Prince Albert Volunteers, clashed with the Metis under Gabriel Dumont near Duck Lake. The loyal force lost 9 killed and 14 wounded, of whom 3 subsequently died. This was the signal for the uprising of Indians under Poundmaker and Big Bear who had been incited by agents of Riel. Prince Albert, Battleford, Fort Saskatchewan and Edmonton were crowded with settlers coming in for shelter. On April 2 Big Bear's band on their reserve at Frog Lake massacred nine white men including the Indian agent, the farm instructor and two Catholic priests, and carried off as prisoners the white women of Frog Lake and the Hudson Bay trader of nearby Fort Pitt, W. J. McLean with his family. Fort Pitt was evacuated and burned by the North-West Mounted Police under Inspector Dickens, a son of the novelist. The district north of the main line of the Canadian Pacific Railway, then under construction, and along the north and south branches of the Saskatchewan river was ablaze with rebellion.

Only prompt action could prevent further spread.

On March 23, Major-General Frederick Middleton was instructed to mobilize troops. He set out from Ottawa that evening, arrived at Winnipeg on the morning of the 27th and that same evening left for Qu'Appelle with the 90th Battalion of Winnipeg. At Calgary a column was formed under the command of Major-General Strange, an English veteran who had a ranch in the Blackfeet country. Meanwhile troops from Halifax, Montreal, Toronto and other points were being hurried to the North-West by the Canadian Pacific railway. Unfortunately in the line north of Lake Superior there were three gaps over which it was necessary to march and many of the soldiers suffered from frost-bite.

The advance was made in three columns. The first under Gen. Middleton set out from Qu'Appelle with Batoche as its objective; the second under Lieut.-Col. W. D. Otter started from Swift Current for the relief of Battleford threatened by Poundmaker; the third or Alberta column marched from Calgary under Gen. Strange to seek out Big Bear with his prisoners. The following engagements with the enemy resulted. On May 28, Gen. Strange's column came into contact with Big Bear's band in an impregnable position at Frenchman's Butte and was forced to retire with two wounded. Col. Otter, after relieving Battleford, marched out to attack Poundmaker at Cut Knife Hill on May 2 and had 8 killed and 14 wounded. Gen. Middleton's column met Dumont's men at Fish Creek on April 24 and in an indecisive fight lost 10 killed, one of them a young medical student from Winnipeg, and 40 wounded. After a halt to enable supplies to come up he advanced toward Batoche and in a four-day engagement captured that stronghold. Riel fled, resistance collapsed, but in that fighting 8 Canadians were killed and 46 wounded.

The medical arrangements for the campaign may be said to date from April 11 when the minister of Militia, Sir Adolph Caron invited Darby Bergin, M.P. to organize a Medical Staff Corps. Col. Bergin, Irish by birth, practised at Cornwall, sat as Member of Parliament for that constituency and was serving his second term as President of the College of Physicians and Surgeons of Ontario. He had served 8 years as company officer in the militia and had organized the 59th Stormont Battalion of Infantry which he commanded for 16 years. He became Surgeon-General and selected as his Deputy Surgeon-General Dr. Thomas Roddick of Montreal and as Purveyor-General, Senator the Hon. Michael Sullivan, Professor of Surgery at the Royal College of Surgeons, Kings-ton. The preparation of medical supplies was entrusted to Dr. C. M. Douglas, V.C., late Deputy Surgeon-General H.M. Service. Medi-

cal supplies were purchased at Montreal and New York. At the time, as now, there were cordial relations between the two countries and the Surgeon-General gratefully acknowledged the rapidity and accuracy with which Col. Girard of New York filled his orders. The field hospital staffs were computed on the basis of providing for an army of 6,000 men for six months. Actually only about 5,000 troops were mobilized and the campaign lasted little more than six weeks.

The selections for the leading medical positions were wisely made. Here is the estimate of Dr. Thomas Roddick by the Surgeon-General in his official report: "One of the most distinguished of Canadian surgeons, young, full of vigour, of powerful physique, knowing no fatigue, a first class horseman. I looked upon him as just the man for the place and the result has amply justified the selection."

There was no lack of recruits. Almost all the medical students in the country volunteered and were ready to serve without pay. This was not allowed, but from the ambulance and first aid classes that had been formed under Dr. James Bell of Montreal and Dr. O'Reilly of the Toronto General Hospital many were chosen to be dressers, orderlies and stretcher bearers. In the field the medical officers and the stretcher bearers repeatedly did their duty and even beyond their duty in carrying out of danger under fire the severely wounded men. The official report mentions in this connection especially Surgeon E. A. Gravely of Cornwall, Ontario and Dr. A. Codd of Winnipeg. A Red Cross Corps was organized under Mr. Edwin Wragge, General Manager at Toronto of the Grand Trunk Railway. The young medical men who joined it were instructed in first aid and stretcher drill by Dr. Nattress of Toronto and they rendered valuable service in the hospital at Battleford after the fight at Cut Knife Hill.

Two Field Hospital Corps were set up, the first under C. M. Douglas, V.C., Lakefield, Ont. as Surgeon-Major, the second under H. R. Casgrain, M.D., of Windsor, Ont. The first corps accompanied Roddick, leaving Ottawa on April 7. They reached Winnipeg via Chicago on April 12 and there Roddick arranged with the Directors of the Winnipeg General Hospital for the accommodation of sick and wounded soldiers at a rate of \$1.50 per diem. He appointed Dr. James Kerr, Dean of the newly formed Medical College, and Dr. F. H. Mewburn to take charge of the military wards. These wards did not close until the middle of 1886.

General Middleton instructed Roddick to establish a base hospital at Swift Current, and to ship all medical supplies by river steamer down the South Saskatchewan as the overland route was considered unfit. Roddick and the Field Hospital Corps reached Swift Current on

April 16 and the surgeons and dressers occupied a caboose, emigrant sleeping car and box car furnished by Supt. Egan of the C.P.R. The emigrant sleeping car was considered by Roddick to be well adapted to the transportation of casualties. On April 19, Surgeon-Major Douglas was ordered to report to Major-General Strange at Calgary and to take with him a full hospital outfit. Three days later Surgeon James Bell left with orders to take passage on the steamer *Northcote* then lying at Saskatchewan Landing to a point on the river nearest to Gen. Middleton's headquarters. As it was found that Douglas was not required at Calgary he returned to Swift Current. On April 29, word came that the *Northcote* was grounded with little prospect of getting off. Knowing how urgently certain articles would be needed after the fight at Fish Creek, Roddick determined to travel by the Moose Jaw trail. On April 30 he, Surgeon Pelletier and four dressers, with Mr. James Ross guiding them, left Moose Jaw with their outfit stored in two double waggons, a cart for forage and two spare horses. On the way he learned that the wounded were being brought up the river to Saskatoon under charge of Brigade-Surgeon G. T. Orton. At 2 a.m., May 3, he reached Saskatoon having made the journey from Moose Jaw in the then unprecedented time of sixty hours. Surgeon-Major Douglas had arrived an hour or two earlier having paddled alone in a 12-foot collapsible canvas canoe from Saskatchewan Landing through hostile country, a distance of over 200 miles. It was a trip that called for much pluck and endurance. Thirty-five wounded from Fish Creek were by this time at Saskatoon. On May 4, Roddick reached Middleton's headquarters and discussed matters with him and Dr. Orton. It was decided to establish a field hospital at Saskatoon and a base hospital either at Swift Current or Moose Jaw. Surgeons Bell and Gravely with six dressers were sent to Gen. Middleton's column on May 6, to act as a field surgical unit. Three houses in Saskatoon were requisitioned for hospital purposes and on May 12, Nurse Miller of the Winnipeg General Hospital reached Saskatoon and immediately took charge of the wounded. The same day word was received of the capture of Batoche. Two days later the *Northcote* arrived with the dead and wounded from Batoche and on May 16 Surgeon Bell arrived from the front and was put in charge of the Saskatoon hospital.

In the meantime it had been decided to establish the base hospital at Moose Jaw and the Moose Hotel there was requisitioned for the purpose. Twenty-eight of the wounded embarked at Saskatoon on the *Northcote* on May 21 and reached the Elbow of the Saskatchewan on May 23. The overland trip of fifty miles to Moose Jaw was made in two days but was so trying to the seriously wounded that Surgeon-

Major Douglas suggested that when the Saskatoon hospital should be closed the wounded might be transported to Winnipeg by the Hudson's Bay Company boats. Surgeon-Major Casgrain was put in charge of the Moose Jaw hospital. Four sisters of St. John the Divine and three skilled nurses from Toronto reached Moose Jaw on May 30 and did efficient work until the hospital closed in July.

Dr. Roddick returned to Saskatoon and received permission from Gen. Middleton to move the wounded from Saskatoon by water. Under Capt. T. H. Tracy, 7th Fusiliers, a barge 50' x 16' was fitted up to accommodate beds for 20 wounded. The barge had a double ceiling of canvas and sides of canvas which could be raised or lowered as desired. Another barge was stocked with a liberal supply of fresh meats and vegetables together with two milch cows. By barge and steamer the wounded were transported down the Saskatchewan River, around Grand Rapids by six miles of tramway, then by steamer to Selkirk and Winnipeg, a distance of 1,100 miles. At the end of the voyage no one was the worse for the trip and many were the better for it. Dr. Kerr awaited the arrival of the steamer at Winnipeg and the wounded were transferred in comfortable waggons to the Winnipeg General Hospital.

The Deputy Surgeon-General who had been constantly in the field was impressed with the remarkable rapidity with which wounds healed and the very low mortality of the sick and wounded. There was singularly little sickness, one exception being the death of a very gallant officer who had led his battalion at Batoche. This was Lieut.-Col. A. T. H. Williams, M.P., O.C. Midland Battalion who died on July 5 of typhoid fever complicated with meningitis.

The list of the medical officers and dressers in this campaign is a veritable Who's Who of Canadian physicians and surgeons of that time. Dr. Thomas Roddick became Dean of the McGill Medical Faculty, Member of Parliament, a K.C.M.G. and had the honour of introducing in parliament a bill to establish Dominion-wide medical registration. The Canadian Medical Association appointed him as the first Honorary Member. James Bell became Professor of Surgery of McGill, James Kerr, Professor of Surgery at Georgetown University, District of Columbia, and F. H. Mewburn was appointed first Professor of Surgery in Alberta University. George T. Orton, M.P., became chief surgeon of the Canadian Pacific Railway. Others of note were John and W. P. Caven of Toronto, J. M. Elder of Montreal, M. M. Seymour of Regina, Frank Keele of Portage la Prairie, G. S. Ryerson of Toronto, F. H. Powell of Ottawa, W. R. Tracy of Belleville, W. W. Doherty of Kingston, N.B. J. P. Pennefather of Winnipeg recorded his experiences in a book, *Thirteen Years on the Prairies*. C. P.

Mulvaney of Toronto wrote a *History of the North-West Rebellion* which was published in 1886. Dr. J. H. Tofield cared for wounded soldiers from Battleford in a small building at Fort Saskatchewan. This was the first military hospital in Alberta.

Those mentioned in despatches by Major-General Sir Frederick Middleton were Dr. Roddick, Dr. Orton, Dr. Gravely, Dr. Bell and Nurse Miller ("whose services as Head Nurse to the wounded were invaluable and unremitting"). In despatches by Lieut.-Col. Otter were Brigade-Surgeon Strange, I.S.C., and Surgeon Joseph W. Leslie, Q.O.R., and by Major-General Strange, Surgeon Pennefather and Surgeon L. A. Pare. Rev. D. M. Gordon, chaplain of the 90th Battalion, later Principal of Queen's University wrote that the surgeons and their attendants in the field at Fish Creek and Batoche did their work admirably.

As further examples of improvisation one may record the construction of very comfortable ambulances under the direction of Dr. Orton for the transport of the wounded from Fish Creek to Saskatoon, a distance of 42 miles. Stretchers of canvas and fresh cowhide were slung to the sides of waggon boxes and over these canvas awnings were supported by bent willows. The stretchers were supported by a plentiful supply of hay. At Batoche, R. S. Cooke of French's Scouts received a compound fracture of the head of the tibia. No plaster of Paris being available the leg was put in blue clay splint by Drs. Orton and Codd. At Winnipeg Dr. Kerr did three major operations, incision and drainage of an empyema, excision of a large hydrocele of the neck situated deeply in contact with the carotid sheath and subclavian artery, and incision of a knee-joint with extraction of a bullet. All ran an aseptic course and resulted in complete cures.

In comparison with Canada's part in two World Wars the 1885 rebellion seems a very small affair, yet when one considers that this was only seventeen years since Confederation, that Canada's population was only four and one-half millions, and that of these few had seen a shot fired in anger, the Saskatchewan campaign assumes another aspect. It proved the value of a medical Staff Corps and showed the weaknesses of the regimental medical system. One may say that the Canadian Army Medical Corps owes its being to this experience. It showed that civilian medical men could quickly adapt themselves to the emergencies of military medicine. Above all it showed the genius for improvisation inherent in a pioneer country.

Fires in the United States during the past twelve months took a total of 11,000 human lives and destroyed property to the extent of \$709,621,000, which made the year the worst in U.S. history. The leading cause was carelessness in the use of matches and smoking materials.

ASSOCIATION NOTES

"SASKATOON IN JUNE"

The program for the June meeting in Saskatoon is now beginning to assume final form. It will be fully up to the scientific standards of previous years. Accommodation is assured for all who desire to attend and none of the hotels are more than six blocks from convention headquarters. There will be continuous bus service from convention headquarters to the places of the various meetings. The ladies' program will be complete and well varied.

Remember the income tax concessions which attendance at this convention will permit. Travel will be pleasant and comfortable, especially by air, as Trans-Canada Air Lines will

have North Stars in operation across Canada arriving at and departing from Saskatoon at most convenient hours. We are anxious to see as many of you as possible at this meeting and you will be made more than welcome at Saskatoon. Let your slogan be, "Saskatoon in June".

Bus Tours

In case any members should be interested in bus trips to Lake Waskesiu or the Canadian Rockies these can be arranged if a sufficient number apply. The Waskesiu trip could be done in one day. A proposed tour of Banff, Jasper and the Canadian Rockies would be somewhat as follows:

A combination Charter Tour to include Calgary, Banff, Lake Louise, Jasper, Edmonton and return to Saskatoon might be of particular interest. This could be pre-arranged as an Expense Paid Tour, including hotels and transportation charges. An example itinerary of this proposed schedule is as follows:

When You Leave

Saskatoon/Calgary

Lv. Saskatoon	8.00 a.m.
Ar. Rosetown	
Ar. Drumheller	
Ar. Calgary	5.00 p.m.
Double room reservations at the Palliser at \$7 per night.	

Calgary City Tour

Calgary to Banff

An informative City Tour of Calgary in the forenoon, then luncheon.

Lv. Calgary	2.00 p.m.
Ar. Banff	4.00 p.m.
Double room reservations at Banff Springs Hotel at \$14.00.	

Tour of Banff Resort

Banff to Lake Louise

Lv. Banff	2.00 p.m.
Ar. Bow Valley	
Ar. Johnson's Canyon	
Ar. Mt. Eisenhower	
Ar. Lake Louise	5.00 p.m.
Double room reservations at Chateau Lake Louise at \$14.00.	

Lake Louise to Jasper

Lv. Lake Louise	8.00 p.m.
Ar. Emerald Lake	
Ar. Moraine Lake	
Ar. Columbia Ice Fields	
Ar. Jasper National Park	5.00 p.m.
Double room reservations at the Jasper Park Lodge at \$18.00 per night (two nights here).	

Tour of Jasper Resort

Half Day of Relaxation

Jasper — Edmonton

Lv. Jasper	10.00 a.m.
Ar. Edmonton	5.00 a.m.
Double room reservations at the McDonald at \$7.50 per night.	

Edmonton — Saskatoon

Lv. Edmonton	8.00 a.m.
Ar. Lloydminster	
Ar. Saskatoon	6.00 p.m.

What You See

First Day

A pleasant relaxing drive from Saskatoon through the farmlands of Saskatchewan and the ranchlands of Alberta, arriving in Calgary early, stopping at the Palliser Hotel for an overnight rest.

Second Day

A short morning sightseeing drive around Calgary City. Points of interest may be visited by the group before luncheon; then a comfortable 80 mile drive through the foothills of Alberta and on into the Rocky Mountains and Banff, "Twenty Switzerlands in One" Resort.

Third Day

After breakfast, a tour of Banff including the Cascades of Time, Bow Falls, Banff Springs Hotel and Buffalo Park. After luncheon, leave Banff on a leisurely trip via the Valley of the Bow, Johnson's Canyon, past Mount Eisenhower to Lake Louise, where the night is spent at the Chateau Lake Louise.

Fourth Day

An all day, leisurely, unsurpassed, sight-seeing trip through the Rockies enroute via the Bow Lakes, Peyto Lake, Glacier and the Summit. Check into the Jasper Park Lodge until sixth morning.

Fifth Day

Include a 26-mile tour of Jasper, morning or afternoon; embrace Lac Beauvert, Old Fort Point, Pyramid Lake, Maligne Canyon. Rest of your day free for golfing, swimming or just loafing.

Sixth Day

A leisurely, sightseeing drive down out of the Rocky Mountains from Jasper, into the foothills and the farmlands into Edmonton City, checking into the McDonald Hotel for the night.

Seventh Day

Leaving Edmonton through the farmlands of Alberta, via the Oil-lands at Lloydminster into Saskatchewan and the sunny wheatlands of the province, arriving at the Bessborough at 6.00 p.m. End of Tour—1,305 miles.

Additional Travel Information

Rest Stops.—Ample time is allowed for meals which are not shown on the above itinerary, and short rest stops are made about every two hours at convenient points where lunch and rest room facilities are available.

Baggage.—One hundred and fifty pounds of baggage may be carried free.

Meals.—Meals are not included. Through experience, it has been found more satisfactory to leave the choice of meals with the passenger. The cost will depend largely on your individual taste.

Hotels.—Room reservations may be pre-arranged at the hotel of your choice. The outline herewith is for first class accommodation at leading hotels at current rates.

We feel that this tour as outlined, to and through the Canadian Rockies, travelling in a new, modern bus; your host an experienced, capable driver could be a memorable experience for your visitors from Eastern Canada.

Golf

Excellent facilities for golf have been arranged and we would like to see a good turn out of golfers. There will be play for the Ontario Cup and miniature for the lowest net score and the Alberta cup for the team of four posting the lowest net score. There will also be prizes for various other competitions. Transportation to and from the golf course has been arranged for, but we request that you bring your own clubs if it is at all possible.

Arrangements have also been made for a ladies' tournament.

"SASKATOON IN JUNE"

Convention Highlights

An excellent professional program.

The first formal meeting of the General Practitioners' Section.

The British Commonwealth Medical Conference in the preceding week.

Medical Economics Conference with British Commonwealth speakers.

Scientific exhibits of a very high quality including:

A. B. C. exhibit of the Army, staged by Canadian and American experts.

Showing of the only Betatron in Canada.

Exhibits of the National Research Council's Western Regional Laboratory.

PROPOSED AMENDMENTS TO CONSTITUTION AND BY-LAWS

The Committee on Constitution and By-Laws, under instructions from the Executive Committee, has studied: (1) the responsibilities of the President, the Chairman of General Council, the General Secretary, the Assistant Secretary and the Sub-Executive Committee; (2) the revision of Chapter V of the By-Laws relative to Sections. Resulting from these studies, recommendations have been drafted by the Committee for consideration by the General Council in June. In order to take constructive action in June upon these recommendations, the General Council must be in a position to make the necessary changes in the Constitution and By-Laws. To conform with the required procedure, notice is hereby given that the following proposed revisions of the Constitution and By-Laws will be brought before the General Council at its next meeting for consideration and action.

Re SUB-EXECUTIVE COMMITTEE

Article X.—Committees

(a) The Executive Committee shall be elected by the General Council; the other standing committees shall be appointed by the Executive Committee. There shall be the following standing committees:

1. The Executive Committee.
2. The Committee on Legislation.
3. The Committee on Medical Education.
4. The Postgraduate Committee.
5. The Central Program Committee.
6. The Committee on Constitution and By-Laws.
7. The Committee on Archives.
8. The Committee on Public Health.
9. The Committee on Ethics and Credentials.
10. The Committee on Economics.
11. The Committee on Pharmacy.
12. The Committee on Hospital Service.
13. The Cancer Committee.
14. The Committee on Maternal Welfare.
15. The Committee on Nutrition.
16. The Committee on Industrial Medicine.
17. The Committee on Membership.

In addition to the aforesaid standing committees, the Executive may appoint at its first meeting or at any subsequent meeting, a Sub-Executive Committee which shall function as a standing committee within the limits hereinafter described until the next Annual Meeting. All members of the Sub-Executive shall be

members of the Executive and the President shall be one of them; and the Executive may add others of its members to the Sub-Executive at any time in addition to the original members of the committee.

CHAPTER IX—COMMITTEES

Section 18.—Sub-Executive Committee

It shall be the duty of the Sub-Executive Committee to advise the President on any matter relating to the Association's affairs on which he may consult it, and to advise any other officer of the Association who may consult it on any matter within the scope of his duties as such an officer, but no officer of the Association shall be bound to act upon the advice of the Sub-Executive nor shall he be relieved of any responsibility solely because he has acted upon such advice.

Renumber the remaining Sections, as follows:

Section 19—Special Committees.

Section 20—Reports of Committees.

Section 21—Limitations of Committees *re* Finances.

Re ASSISTANT SECRETARY

CHAPTER VII—DUTIES OF OFFICERS

Section 7.—Duties of the Assistant Secretary

The Assistant Secretary, under the direction of the General Secretary, shall perform such of the latter's duties as may be assigned to him by the General Secretary, and in the absence of the General Secretary, the Assistant Secretary shall have all the powers and may exercise all the functions herein allocated to the General Secretary.

CHAPTER IX—COMMITTEES

Section 1.—Duties and Powers of the Executive Committee

Third Paragraph:

The Executive Committee shall be responsible for the appointment of the General Secretary, the Assistant Secretary, the Editor, the Managing Editor, the Associate Secretaries, and any other appointive officers, and shall fix their salaries.

Re MAIL BALLOT OF EXECUTIVE COMMITTEE

CHAPTER IX—COMMITTEES

Section 1.—Duties and Powers of the Executive Committee

After the second paragraph, insert the following new paragraph:

The Chairman of the Executive Committee instead of calling a meeting thereof *may* and, if requested so to do in writing by any three members of the committee, *shall* take a mail ballot of the elective members of the Executive Committee on any urgent matter, and an affirmative vote by two-thirds of such members shall have the same force and effect as a resolution duly passed at a regular meeting of the Executive, provided such mail ballot is taken in the following manner:

The question submitted shall be in a form to which an affirmative or negative answer may be given. The ballot shall be sent by prepaid registered post to all elective members of the Executive not less than ten days before the last return date accompanied by a letter signed by the Chairman of the Executive Committee setting out the circumstances of the emergency, and giving the last date on which ballots will be received, and requesting that ballots be signed and returned to the Secretary of the Association by such elective members by the date named. Simultaneously with the sending out of the ballots to the elective members of the committee, a copy of the aforesaid letter shall be mailed to those members of the Executive Committee who are not entitled to vote, together with a copy of the question which is being submitted to the elec-

tive members. No ballot which is not signed by an elective member of the Executive and in the hands of the Secretary of the Association not later than the return date named, may be counted, and each elective member may cast one ballot only.

Re DECISION AS TO RIGHT OF ALTERNATES TO ACT

CHAPTER VI—OFFICERS AND EXECUTIVE COMMITTEE

Section 2.—Duties of Nominating Committee

Paragraph 3.—Nomination from members of General Council of nine alternates for the elected members of the Executive Committee. There shall be one alternate nominated from each Province. The function of the alternates shall be to act in the place of an elected member of the Executive Committee who is absent because of death or illness or from cause acceptable to the Chairman of the Executive Committee.

SECTIONS

Amend Chapter V of the By-Laws by striking out the whole of the said Chapter and substituting the following:

CHAPTER V—SECTIONS

Section 1.—Organization

Members of the Canadian Medical Association may, with the consent and approval of the General Council, organize a Section for the purpose of studying and discussing subjects of interest.

Section 2.—Recognition of Existing Sections

The following Sections are recognized as existing on the 13th day of June, 1949:

Anæsthesia	Armed Forces Medical
Dermatology	Section
Historical Medicine	General Practice
Medicine	Industrial Medicine
Ophthalmology	Obstetrics and
Pædiatrics	Gynæcology
Psychiatry	Otolaryngology
Surgery	Preventive Medicine
	Radiology
	Urology

Section 3.—New Sections

New Sections may be organized on the application in writing of not less than 25 members of the Canadian Medical Association setting forth the subject or subjects proposed for study and discussion by the Section and the proposed name of the Section. Such application shall be filed with the General Secretary of the Canadian Medical Association, and shall be submitted by him to the next meeting of the Executive Committee after the application is received, and the Executive Committee shall transmit the application to the next meeting of the General Council with its recommendations in respect of the application, and the General Council may grant the application in the form made or with such variations therein as the applicants may approve, or may refuse the application or postpone consideration thereof.

Section 4.—Meetings

Subject to the approval of the Executive Committee, a meeting of each Section will be held during the Annual Meeting of the Canadian Medical Association. Other meetings of a Section may be called by its Chairman with the approval of the Executive Committee. Notice of a meeting of a Section other than a meeting to be held during the Annual Meeting, shall be given by publication in an issue of the *Journal* of the Canadian Medical Association published not less than one month prior to the meeting.

Section 5.—The Right to Attend and Vote at Meetings

(a) Members of the Canadian Medical Association attending the Annual Meeting may register in any Section or Sections, but such registration shall have force until the next Annual Meeting only.

(b) Any member of the Canadian Medical Association may attend any meeting of any Section.

(c) No member of the Canadian Medical Association may vote at any session of a Section unless he is registered in it as aforesaid prior to the commencement of such session.

(d) One delegate only of an affiliated society who is not a member of the Canadian Medical Association may attend Section meetings but he may not vote thereat.

Section 6.—Officers

There shall be a Chairman and Secretary of the Section elected at a meeting thereof held during an Annual Meeting of the Canadian Medical Association, and they shall hold office from the close of that meeting until the close of the next meeting of the Section held during an Annual Meeting. In the event of either of the said officers not being elected as aforesaid or resigning or dying or becoming incapacitated during his term of office, the Executive Committee may appoint a member of the Canadian Medical Association to fill the office until the next election.

Section 7.—Duties of the Chairman

The Chairman, or someone designated by him, shall preside at all meetings of the Section, and if he be absent and no one has been designated by him to preside, the meeting of the Section shall elect a Chairman.

Section 8.—Duties of the Secretary

The Secretary of the Section shall keep a correct record of its transactions in duplicate and one copy shall be handed to the General Secretary of the Canadian Medical Association for insertion in the Minute Book provided for the purpose. The other copy shall be retained by the Secretary of the Section for the use of the Section and its officers.

Section 9.—Program at Annual Meetings

It shall be the duty of the Chairman and the Secretary of the Section to co-operate with the Central Program Committee, to arrange for the meeting of the Section to be held during the Annual Meeting.

Section 10.—Dissolution of Sections

In the event of it appearing from the small number of registrations in a Section or the failure to hold meetings thereof, or on any other ground, that interest in its subject or subjects is lacking, the General Council, on the recommendation of the Executive Committee, may dissolve the Section, and it shall not be revived except upon a new application for recognition.

Section 11.—Authority of the Section

No Section or meeting of a Section and no officer or officers of a Section shall have the right to speak for the Canadian Medical Association as such, but any resolution passed at a meeting of a Section may, if the meeting so decides, be submitted to the General Council or the Executive Committee of the Canadian Medical Association for consideration and action, and it shall be the duty of the General Council or the Executive Committee, as the case may be, to receive such resolutions and consider the same and take such action as it may decide in respect thereof at its first meeting after the receipt of such a resolution.

COURS DE BRONCHO-ESOPHAGOLOGIE.—Un Cours théorique et pratique sera fait à Paris par le Pr. Chevalier L. Jackson et le Dr. A. Soulas. Il commencera le 3 Juillet et se terminera le 14 Juillet 1949. Renseignements précis à venir.

MEDICAL SOCIETIES

La société médicale des hôpitaux universitaires de Québec

Société médicale des hôpitaux universitaires de Québec, le 15 octobre, 1948.

Hyperostose corticale infantile du maxillaire inférieur. —Marcel Langlois et Roland Thibodeau.

Les auteurs rapportent un cas d'hyperostose corticale infantile du maxillaire inférieur, affection excessivement rare puisqu'on n'en compte que dix-sept cas dans la littérature médicale. L'étiologie et la pathologie de ce syndrome restent obscures. L'affection débute dans les premiers mois de la vie par un oedème localisé surtout à la figure, mais pouvant apparaître aussi au niveau du thorax, du cou, du cuir chevelu et des extrémités . . . et s'accompagnant toujours d'une hyperplasie sous-périostée des os sous-jacents, mise en évidence radiologiquement. A ces symptômes principaux peuvent s'ajouter la fièvre, l'hyperleucocytose, la sédimentation globulaire élevée, de l'anémie, de l'irritabilité, de la dysphagie, de l'anorexie et enfin de l'épanchement pleural.

La durée de la maladie est de quelques semaines à plusieurs mois et la guérison s'obtient spontanément. Toute thérapeutique est inutile. Fait à noter: tous les malades ont présenté durant leur longue maladie, une croissance normale.

Neoformations médiastinales et troubles de la motilité laryngée.—O. Frenette, J. Hallé et M. Caux.

Après un bref rappel anatomique de l'innervation laryngée, les auteurs énumèrent les principales causes de paralysie des cordes vocales. Puis ils présentent les observations de deux patients venus consulter uniquement pour de la dysphonie. Chez le premier on a trouvé des métastases ganglio-pulmonaires secondaires à un néoplasme d'origine digestive, chez le second, une tumeur médiastinale primitive. En conclusion ils notent la fréquence des paralysies laryngées par compression médiastinale et la possibilité de découvrir une telle compression par un examen soigné de l'organe.

Anémie par carence.—R. Lemieux, Guy Drouin, Antonio Martel.

Les auteurs rapportent les observations de deux patientes qui ont présenté des formes graves d'anémie macrocytaire par carence. Chez la première patiente, l'anémie a débuté progressivement pendant les derniers mois de la grossesse, à la faveur d'une alimentation fortement carencée. Les accidents aigus se sont manifestés 10 jours après l'accouchement, avec une fièvre élevée qui risqua de faire erroner le diagnostic. La deuxième patiente a présenté la symptomatologie clinique et hématologique de l'anémie macrocytaire consécutive à 10 années de privations alimentaires sérieuses. Les auteurs rappellent l'étiologie et la pathogénie des anémies macrocytaires par carence. Ces formes d'anémie habituellement confondues avec l'anémie pernicieuse de Biermer surviennent chez des individus privés pendant longtemps de viande de bœuf, de lait, d'œufs, de certaines céréales. L'élément responsable de l'apparition de ce syndrome anémique est une déficience du facteur antianémique extrinsèque "de Castle".

Le traitement de l'anémie macrocytaire par carence comprend, en plus des transfusions sanguines et du foie de veau, surtout l'emploi de l'acide folique et des vitamines du complex B.

Histopathologie et néoformations de l'orbite.—H. Pichette.

Les diverses manifestations de l'activité cellulaire prennent chaque jour des caractères différents et des formes atypiques. Nous sommes, même en médecine, dans

le cycle des réactions à chaînes, "in the midst of an explosion". La technologie et la spécialisation ont apporté des progrès extraordinaires mais par contre, elles ont contribué à diminuer l'esprit critique et la finesse de compréhension que nos maîtres anciens possédaient à un si haut degré.

Deux cas très atypiques de néoformation de l'orbite sont rapportés, et les relations très étroites entre les néoformations de l'orbite et celles de l'endocrâne sont étudiées.

Depuis le dernier quart de siècle surtout, les sciences de la nature ont fait des progrès qui ont devancé ceux de la médecine. Il appartient maintenant au médecin, parce que lui seul a l'expérience clinique, de synchroniser sa pathogénie sur les connaissances acquises en génétique, en biologie expérimentale, en chimie et en physique. La médecine de demain devra attacher plus d'importance aux causes qu'aux effets et tenir compte davantage de tous les facteurs physico-chimiques qui peuvent modifier l'armature chromatique de la cellule i.e., les chromosomes et les gènes.

Société médicale des hôpitaux universitaires de Québec, le 17 décembre, 1948.

Présentation d'un cas de méningo-myelocèle extra-orbitaire.—Jean Sirois.

Il s'agit d'un enfant de 2½ ans qui a été opéré avec succès et à cette occasion, l'auteur en profite pour faire quelques courts commentaires au sujet du site inusité de la tuméfaction crânienne, de la connaissance que nous devons posséder des localisations des méningocèles ou des malformations osseuses crâniennes afin d'éviter des erreurs préjudiciables au malade, de la façon de procéder pour faire le diagnostic exact, et enfin, la voie d'approche employée pour obtenir une cure chirurgicale.

Les angiomes cutanés chez l'enfant.—H. Lapointe.

Les angiomes cutanés chez l'enfant, tumeurs bénignes susceptibles d'accroissement, doivent être traités le plus précocement possible après le début de leur évolution. Leurs dimensions restreintes ne posent pas de problème de traitement ni de problème d'esthétique pour l'avenir. Il est tout-à-fait simple de les détruire par une électro-déssication superficielle bien faite sans causer de cicatrice importante si ces angiomes sont peu étendus, même à la face. Les angiomes étendus ou sous-cutanés doivent être traités par la roentgenthérapie ou la curi-thérapie, sauf pour certains grands angiomes du cuir résevés à la chirurgie. Evitons les retards dans l'application du traitement pour tous les angiomes, afin d'avoir le moins possible à les traiter par les irradiations parfois susceptibles de causer par ailleurs des troubles d'accroissement osseux ou autres, traitement qui est d'ailleurs plus incommode, plus lent et plus coûteux, mais qui devient nécessaire lorsque le petit angiome non traité à son début par destruction localisée a poussé au point de ne plus être traitable de cette façon.

Intoxication collective par les vapeurs métalliques.

Aspect médical. Aspect médico-social.—W. LeBlond.

Dans un groupe de vingt-et-un ouvriers engagés durant une période de un mois et plus à des travaux de découpage de cloisons métalliques et de soudure au chalumeau oxyacétylénique, sans protection individuelle ni collective adéquate dans un espace clos, dix-huit ont présenté à des intervalles divers, à partir de quinze jours après le début de ces travaux, et à des degrés divers, les manifestations suivantes: sécheresse et sensation de constriction des voies respiratoires supérieures, accès de toux sèche de suffocation accompagnés de hauts-le-cœur (dry retching); état nauséux, goût métallique dans la bouche, sensation de barre au creux épigastrique et crampes abdominales; vomissements muqueux; malaise, céphalée intense, vertiges, asthénie, douleurs dans les membres, tremblement des extrémités; transpiration profuse avec accélération du pouls et hyperthermie contrôlée allant jusqu'à 104°.

L'hypotension a été constatée six fois dans ces phases aiguës. Dans aucun cas on n'a noté la présence de liséré gingival. La recherche des hématies à ponctuation basophile pratiquée dans 16 cas fut toujours négative. Il faut remarquer cependant que cette recherche des granulobasocytes ne peut être faite, par suite de causes circonstancielles, que tardivement soit six semaines et plus après la période des manifestations aiguës. Celles-ci ont dû rester cédées en général rapidement sous la simple action du citrate de soude par voie orale. Cependant quatre de ces ouvriers ont dû être hospitalisés; deux au moment des accidents aigus et les deux autres plus de six mois plus tard. Ces deux derniers présentent des signes d'atteinte rénale — néphrite azotémique — avec hypertension permanente.

Bien que des analyses de l'air du lieu de travail aient révélé trente-six centièmes (0 mgm. 36) de milligramme de plomb par mètre cube, nous ne croyons pas qu'il s'agisse essentiellement d'intoxication saturnine.

L'hyperthermie contrôlée dans la majorité des cas (dix-huit sur vingt) la sédation rapide des symptômes aigus par le repos de quelques heures et l'administration simple de citrate de soude, l'absence même à une période tardive d'hématies à ponctuation basophile (mais surtout l'hyperthermie) portent à croire qu'il s'agit ici d'une maladie professionnelle autonome, la "Metal fume fever" (ne pas confondre avec la fièvre des fondeurs) ou Fièvre par inhalation de vapeurs métalliques composées auxquelles se joignent les vapeurs nitreuses qui se dégagent de toutes opérations de découpage ou de soudure métallique au chalumeau oxyacétylénique sans distinction des métaux travaillés.

De l'aspect médico-social de la question il ressort ceci; nous avons au Canada, et surtout dans la province de Québec, la législation la plus parfaite qui soit en hygiène industrielle. Cette législation demeurera cependant inopérante aussi longtemps que par une éducation très poussée on n'aura pas convaincu d'une part les travailleurs que la protection de la santé de l'ouvrier est avant tout l'affaire de l'ouvrier, et d'autre part l'employeur que le maintien en bonne santé de sa main d'œuvre est aussi important pour l'augmentation de la production et des dividendes que le maintien en bon état de son outillage mécanique.

Considérations sur la pancréatico-duodénectomie.—P. Poliquin.

Un historique de la chirurgie du pancréas qui, de pratiquement nulle qu'elle était au début du siècle, par une série d'étapes successives, aboutit à l'opération de Whipple: duodéno-pancréatectomie ou extirpation radicale. Présentation de quatre observations de duodéno-pancréatectomie concernant des malades souffrant d'un cancer d'estomac propagé au pancréas, d'un cancer du cholédoque, d'un cancer du pancréas et d'un cancer de l'ampoule de Vater. L'étude est faite des difficultés rencontrées par le chirurgien lors de la laparotomie pour établir le diagnostic. Discussion du choix des interventions palliatives ou de la duodéno-pancréatectomie, le tout complété par des notions sommaires des procédés techniques employés dans les interventions palliatives et la radicale.

The Montreal Medico-Chirurgical Society

The Montreal Medico-Chirurgical Society will hold its annual meeting dinner on May 13, at the Windsor Hotel. The guest speaker will be Dr. Frank Lahey, of Boston, who will speak on "The Present Management of Thyroid Diseases in the Light of some of the Newer Agents now Available".

Essex County Medical Society

Dr. Robert McArthur of Detroit spoke to the Essex County Medical Society at Windsor on "Extra Urinary Lesions Causing Urinary Symptoms and Pathology". Those taking part in the annual Clinic Day at Hotel

Dieu Hospital, Windsor, on April 6 were: Dr. R. E. Holmes, Dr. C. S. Sanborn, Dr. H. Asseltine, Dr. J. Maus, Dr. L. G. McCabe, Dr. J. M. Cole, Dr. M. A. Lever, Dr. George Laing, and Dr. C. R. Weber who spoke on "Investigation of Chronic Cough", Dr. Alan Taylor who reported a case illustrating the management of Rh factor problems, Dr. H. G. Stratton who discussed "Psychological Factors at Climacteric", Dr. E. K. Lyon who spoke on "Medical Public Relations" and Professor Ray Farquharson who gave papers on "Biliary Disease" and on "Thyroid Disease".

Academy of Medicine, Toronto

The Oto-laryngologists of Montreal were the guests of the Section of Oto-laryngology of the Academy of Medicine, Toronto, at Sunnybrook Hospital on March 19th. Dr. J. A. Sullivan discussed "The Present Status of Fenestration Operation"; Dr. H. McCart, "Results Following Laryngectomy"; Dr. D. E. Wishart, "Bronchography in Bronchiectasis in Children"; and Dr. D. T. Burke "The X-ray Diagnosis in Sinusitis". A luncheon was held at Sunnybrook Hospital and a dinner at the York Club.

Professor Earl D. Osborne, Professor of Dermatology, University of Buffalo, New York, was present at a dinner at the York Club on March 1, 1949, and later addressed the Academy of Medicine, Toronto on "The Treatment of Cutaneous Malignancies".

NOBLE SHARPE

Physiological Society

The Physiological Society of the University of Toronto on March 14, heard a paper on "Biliary and Pancreatic Fistulas" by Dr. A. R. Colwell, Jr. and on March 21, Dr. W. E. Bigelow, Dr. R. O. Heimbecker and Dr. R. C. Harnor discussed "The Intravascular Agglutination of Erythrocytes in Trauma".

Toronto Diabetes Association

At the Toronto Diabetes Association on March 14, Dr. W. R. Campbell dealt with "Kidney Disease in Diabetes" and on March 21, Dr. John Firstbrook and Dr. J. P. Wyatt discussed "The Role of Cholesterol in Vascular Disease".

Canadian Association of Radiologists

The Canadian Association of Radiologists will meet in Saskatoon on the following dates: June 12, Executive Meeting; June 13, Council; June 14, Annual General Meeting with the annual dinner.

The Organization of Cancer Services in Canada

O. H. Warwick, M.D.

Toronto, Ont.

Confusion exists in Canada concerning the part played by various organizations in the cancer field. The following may help to clarify this subject.

There are two national voluntary cancer organizations in Canada, the Canadian Cancer Society and the National Cancer Institute of Canada. Provincially there are agencies acting for, or on behalf of the government in matters pertaining to the diagnosis and treatment of cancer patients.

1. *The Canadian Cancer Society.*—The Canadian Cancer Society was incorporated as a national society in 1938. It is predominately a lay organization and is interested primarily in three aspects of the cancer problem. (a)

Education of the lay public in the early symptoms of those forms of cancer which are amenable to treatment; (b) welfare problems as they apply to the cancer patient and (c) fund-raising for the above purposes and for research. There is a national Board of Directors, twenty in number elected annually with provincial representation. The present Chairman of the Board of Directors is Dr. J. C. Meakins, C.B.E., Emeritus Professor of Medicine at McGill University.

There is a national office which administratively helps to co-ordinate the work of each of the Divisions, of which there is one in each Province, excepting Manitoba.

2. *The National Cancer Institute of Canada.*—The National Cancer Institute was incorporated in 1947. The main aims of the Institute may be described as "The co-ordination of all professional and scientific cancer activities in Canada". Its present program includes: (a) The sponsorship of cancer research; (b) the sponsorship of Fellowships for cancer research workers; (c) the sponsorship of the Canadian Tumour Registry in Ottawa; (d) professional education; (e) the co-ordination of provincial programs for the care of cancer patients.

For its estimated expenditure of \$350,000 for the year 1949-50, the National Cancer Institute will receive funds from the final of three yearly instalments from the King George V. Silver Jubilee Cancer Fund, Provincial grants utilizing Federal grants for cancer control, and voluntary sources, of which the main one is the Canadian Cancer Society.

The organizations represented in the membership of the National Cancer Institute are the Canadian Medical Association, the Canadian Public Health Association, the Canadian Cancer Society, the Dominion Council of Health, the National Research Council, the diagnostic and treatment agencies of the Provinces, the National Federation of Universities, the Royal College of Physicians and Surgeons, the Association of Medical Colleges of Canada and the Department of National Health and Welfare.

Five associate members, scientists who might make independent contributions to the cancer program are nominated by the sixteen representative members from the above mentioned organizations, bringing the voting membership to a total of twenty-one. The Board consisting of five members is elected annually. The affairs of the Institute are under the direction of the Board of which the Chairman at the present time is Dr. L. C. Simard, Associate Professor of Pathology, University of Montreal. On June 1, 1948, the Canadian Cancer Society and the National Cancer Institute became affiliated for administration purposes under the joint executive directorship of Dr. O. H. Warwick.

3. *Provincial diagnostic and treatment agencies.*—The medical care of the cancer patient is a provincial responsibility. In some of the Provinces there are agencies acting with, or for, the government in the care of the cancer patient. The utilization of Federal Grants will probably necessitate some such organization within each Province.

The following situation exists within the Provinces: Prince Edward Island—Division of Cancer Control of the Provincial Government.

New Brunswick—Division of Cancer Diagnostic Services of the Provincial Government.

Ontario—The Ontario Cancer Treatment and Research Foundation.

Manitoba—The Manitoba Cancer Relief and Research Institute.

Saskatchewan—The Saskatchewan Cancer Commission.

Alberta—Division of Cancer Services of the Provincial Government.

British Columbia—The British Columbia Cancer Foundation.

In Nova Scotia and Quebec no provincial agencies exist.

NOTES ON GENERAL PRACTICE

[This column will be devoted to points concerned with general practice. Questions are welcomed. They will be answered by well qualified men. Other short contributions or notes on general practice will also be welcome. General practitioners are particularly invited to make use of the column. All communications should be signed, but the writer's name will be omitted on request.—EDITOR.]

Q. What might be the cause of bad breath in a child of 4 whose tonsils and adenoids were removed 2 years ago? What would be the treatment? Would you discuss the problem of halitosis in general and give references? M.D., Toronto.

A. The usual causes are diseased tonsils and adenoids, sinusitis, infections in the mouth such as Vincent's angina, nasal allergy with secondary infection, possibly some lung lesion such as bronchiectasis. Gastro-intestinal disturbances such as chronic constipation, diarrhoea and inability to handle such foods as eggs, fish, etc. Treatment: Eliminate foci of infection. Eliminate eggs and fish from diet and correct bowel function. (Strange as it may seem there is very little in the literature on the subject. The facts stated are gleaned from several prominent paediatricians.)

Q. In a baby a year old with infantile eczema of a mild type are skin tests advisable to find the offending substances? If nothing is done at present, i.e., if allergens are not omitted would the child be more apt to develop asthma, hay fever, etc., in later life? M.D., Toronto.

A. If elimination diets have failed and there is a possibility of inhalant and contact allergens being causative factors, skin tests may give positive reactions in about 50% of cases. It is noteworthy that about 50 to 60% of atopic dermatitis cases are followed later by some other allergic manifestation such as asthma or hay-fever. Whether tests are done or not, such children should be advised to follow such allergic precautions as: Eliminate feathers from environment, avoid soaps, cosmetics and tooth paste containing orris root, no down comforters, cover wool blankets with cotton sheets, and avoid all animal hairs and stuffed furry toys, etc.

CANADIAN ARMED FORCES

News of the Medical Services

Lieut.-Col. S. W. Cavender, Medical Corps, United States Army has arrived at Army Headquarters, Ottawa, to take up the appointment of U.S. Medical Liaison Officer in the office of the Director General of Medical Services (Army). He relieves Colonel S. M. Corbett who has returned to the U.S.A. Lieut.-Col. Cavender is a Bachelor of Science of Notre Dame University and a graduate in medicine of St. Louis University Medical School. He served in the Pacific theatre during the late war, taking part in the Leyti and Okinawa campaigns.

Following the attendance of a group of Active Force R.C.A.M.C. officers at the Medical Aspects of Atomic Warfare course at the U.S. Army Medical Centre, Washington, D.C., Reserve Force medical officers representing each of the Army commands were selected to attend the course in April, 1949. Those included were: Lieut.-Col. J. H. Shaw, 21 Fd. Amb., Eastern Command; Lieut.-Col. C. E. Stephen, 9 Fd. Amb., Quebec Command; Major R. M. Taylor, 7 Fd. Amb., Central Command; Lieut.-Col. W. M. Bowering, 10 Fd. Amb., Prairie Command; Lieut.-Col. M. Weinlos, 36 C.C.S., Western Command.

Major C. F. Egan, M.B.E., R.C.A.M.C., recently obtained the degree of B.Sc., in Pharmacology from Queen's University, Kingston. Major Egan is at present attending the Senior Officer's Course at the R.A.M.C. College at Millbank, London, England.

Major R. A. Smillie, Hygiene Officer, Prairie Command, was a member of the medical team directed by Dr. J. D. Adamson of Winnipeg, which was flown by the R.C.A.F. to the Central Arctic region to investigate the recent epidemic of anterior poliomyelitis among the Indians and Eskimos.

Lieut.-Col. A. Owen Johnston, representing the Director General of Medical Services, New Zealand Army, paid a liaison visit to Army Headquarters, Ottawa, February 16 and 17, 1949, conferring with the D.G.M.S., Canadian Army on matters of army medical organization, later proceeding to Washington and London to visit the Surgeon General, U.S. Army, and D.G.A.M.S., British Army, respectively.

Wing Commander J. A. Sifton, Senior Radiologist, R.C.A.F., has been delegated to represent the Navy, Army and Air Force Medical Services at the Inter-American Congress of Radiology being held in Santiago, Chile, November, 1949.

Following the policy of further training in Aviation Medicine two more R.C.A.F. Medical Officers have commenced a Flight Surgeon's course at the School of Aviation Medicine, U.S.A.F., Randolph Field, Texas. This course is of twelve weeks' duration and includes military flight training. The Officers who will proceed on the present course are W/C H. J. Bright, Staff Officer of Health Services, North West Air Command and Wing Commander G. H. Graham, Senior Medical Officer, R.C.A.F. Station, Centralia.

Dr. D. R. Wilson, Consultant in Medicine to the R.C.A.F., has been awarded a \$25,000 Research Scholarship by the Markel Foundation in the United States. He will continue his research studies in medicine at the University of Alberta. Dr. Wilson served with the R.C.A.F. Medical Branch during the Second World War as a specialist in medicine. This service included duty in the Middle and Far East in preparation for the expected R.C.A.F. participation in the Pacific Theatre.

It is R.C.A.F. policy that all personnel be qualified in basic first aid. To relieve medical officers of a considerable amount of training details, it has been decided that selected Senior N.C.O. medical personnel should be qualified as first aid instructors. The first class for instructors was recently held at the Institute of Aviation Medicine, Toronto, and each of the eighteen N.C.O.'s attending was qualified by examination as a first aid instructor. This instruction was made possible through the co-operation of the Canadian Red Cross Society in association with Service personnel. These men now hold the C.R.C.S. certificates as first aid instructors. Their further work at unit level will be under the supervision of the medical officers of the unit.

Surgeon Captain A. McCallum, Medical Director General, Royal Canadian Navy, assumed the chairmanship of the Inter-Service Medical Committee as of April 1, 1949, relieving Brigadier W. L. Coke, Director General of Medical Services, Army. The chairmanship rotates annually through the Directors of the Medical Services of the Armed Forces, who along with Colonel E. M. Wansbrough, Director General of Dental Services, and Dr. M. G. Whillans, Superintendent of Medical Research Laboratories of the Defence Research Board, form the Committee. This Committee meets weekly to promote co-ordination of the Medical Branches of the Department of National Defence. It is assisted by a number of standing and temporary sub-committees.

CORRESPONDENCE

Combined Antigens in Immunization

To the Editor:

In your issue of August, 1948, a paper by Fleming *et al.* appeared on the use of combined antigens in the immunization of infants. Two doses of a triple antigen were used at a 3 week interval and antibody response measured from the original base line 3 weeks after the last of these two injections had been given. The conclusions in part were that "This study, in which the average age of subjects was 4 months, showed clearly the need for active immunization and the satisfactory response to it in infancy". (Italics mine.)

The problem of immunization in infants is of the utmost interest to those of us who practise paediatrics. We are perforce guided in our choice of antigen, total dosage and the spacing of injections by the results obtained in controlled, closely followed children such as the Fleming group used in their study. In view of the recent tendency by some to recommend active immunization against pertussis, at an earlier age than that originally suggested by Sauer (*i.e.*, over 7 months) the results for pertussis obtained by Fleming *et al.* were of especial interest. Work such as theirs published in a journal distributed largely among practitioners can sometimes raise queries as to the interpretation of the experimenters' findings. However some statements which proved confusing to the undersigned were noted. This letter is therefore being written in an attempt at having these clarified.

1. How many infants of what particular age groups were used to constitute the average age of 4 months? Since as has recently been again confirmed by di Sant'Agnesse¹ antibody response can vary at the different age levels, presumably the significance of the McGill results could be altered by a preponderance of one age group over the other. To those of us who are in a quandary with regard to the optimum age at which to start immunization particularly against pertussis, such differences are important to know about.

2. Granting that pertussis agglutination is merely a convenient index of immunity and does not necessarily indicate the actual immunity present, nevertheless agglutination in dilutions of anywhere from 1:2 to 1:64 would only indicate that a response was obtained following exposure to the antigen. This is not the same as a satisfactory response in so far as the clinician is concerned although it may seem so from the immunologist's point of view. A satisfactory response to the clinician is synonymous with one which affords protection to the patient. Current literature refers to the "protective" level as being 1:320. At this level exposure of the subject to pertussis is apparently compatible with complete protection.² Under this level even severe cases can occur.³ How then is one to interpret the term satisfactory?

3. Again the statement that "It could therefore be confidently assumed that higher agglutinin levels would have been found in all groups if this longer period (*i.e.*, 3 or 4 months) had been allowed to elapse before antibody titres were determined" is of course an assumption based on the results in the literature. This Dr. Fleming points out. However, recent work in the very young age groups, indicates that this is not necessarily true.¹ One cannot but help wonder what actually is occurring in the Montreal series particularly since the total number of organisms (19 and 38,000,000,000) is less than the usually accepted standards for pertussis immunization with non-alum preparations.

Finally, although the paper points out that "no attempt was made to determine optimal dosage for the antigens used in this study", do the authors mean that their 2 dose of either ½ or 1 c.c. each at 3 week intervals can be regarded by the practitioner as a "satis-

factory" immunization procedure (by the Fleming group's standards) in his own practice?

It would be interesting to learn if further work is being contemplated to the end that the practitioner may more readily apply the results.

LYON N. PEARLMAN, M.D.

REFERENCES

1. DI SANT'AGNESE: *Pædiatrics*, 3: 181, 1949.
2. MILLER, J. S. *et al.*: *J. Pædiat.*, 22: 644, 1943.
3. SAKO, W.: *J. Pædiat.*, 30: 29, 1947.

To the Editor:

I trust that the questions raised by Dr. L. N. Pearlman will be answered by the following statements:

1. The average age of the infants was 4.7 months and 80% were in the age group of 3 to 5 months as shown in this table:

Age in months	No.	Percentage of total
3	34	
4	92	
5	32	80.2
6	11	
7	13	
8	7	
9	1	
10	4	
11	3	19.8

2. The proportion or fraction of *H. pertussis* responsible for protective immunization has yet to be isolated and the agglutinating titre is merely an index to show that an immune response has occurred. The findings of Miller and Sako referred to by your correspondent reflect the confusion in the literature on this point. For example, Powell and Jamieson (*J. Immunol.*, 43: 13, 1942) advocate the use of a rapid slide test for indication of immunity and a titre of 1:8 by the tube test invariably gives a positive slide test. This method has received wide acceptance by public health groups and paediatricians. The titres obtained by us were the result of two inoculations and at this stage the levels of diphtheria and tetanus antitoxin were very encouraging. The agglutinating titres for *H. pertussis* were low, but there was good reason to believe that these would be increased in time. Our levels were as high with the combined products as with pertussis vaccine alone, under the conditions established for the study, and were therefore reported as satisfactory.

3. The assumption just referred to concerning higher *H. pertussis* agglutinin levels was, as your correspondent states, a reasonable one on the basis of existing reports. We are now carrying on follow-up studies which will give results to substantiate this assumption, or they may prove to be in agreement with those of di Sant'Agnesse, whose paper appeared some five months after our own.

4. It must be repeated that our experiments were designed solely for the purpose of determining the relative immunizing efficiency in infants of antigens given singly and in combination. Two doses were considered adequate for our purpose. This was not meant to imply that this was adequate for effective prophylactic immunization and this was definitely stated in our report. In fact, every child in the series depending on the combination employed, was given at least one further inoculation. We would not be prepared to recommend a two-dose course of immunization based on a study designed to investigate another aspect of the problem since controls are not available to allow of conclusions on this point and follow-up studies on the duration of antibody titres would be an essential element of such an appraisal.

DONALD S. FLEMING, M.D., D.P.H.

Impotence and Frigidity

To the Editor:

In the *Journal* for March, 1949, p. 307, a question on impotence and frigidity is answered somewhat misleadingly. Leaving aside the question of frigidity, I would not quarrel with the thesis that the large majority of cases of impotence in the male is due to psychosexual disturbance. But there is a sufficient number of cases associated with organic disease of the testis or pituitary to make it worth while to conduct a simple test on all such cases before attempting a long and difficult course of psychotherapy. I refer to semen analysis. If this is normal with respect to volume, count, motility, and morphology, the impotence is most probably psychogenic. If the semen analysis reveals evidence of testis failure further investigation is warranted, because of the possibility of pituitary disease.

The question as worded in the *Journal* suggested that a therapeutic trial was the first step. This of course is unwarranted when as valuable a diagnostic measure as semen analysis is available to give reliable evidence of testis function.

ALLEN GOLD, M.D.

Septate Vagina

To the Editor:

I was much interested in the case report of Septate Vagina complicating pregnancy by Drs. Acton and Cottrell in your issue of February, 1949, and very much indebted to them for the admirable review of the literature of defects of fusion in the Mullerian system, but I felt a little unhappy at the unqualified optimism of the summary. I had occasion to note recently (*J. Obst. & Gyn. Brit. Emp.*, 66: 55, 1948) two cases of septate vagina complicating pregnancy in which obstruction to labour arose and required operative interference. In both cases the condition was not diagnosed before the onset of labour and in one was not recognized till the resulting urethro-vaginal fistula was investigated in hospital. When such complications of labour can arise with this congenital defect it would seem wiser to call attention to them and so put practitioners on their guard, than to record such a case without stressing the possible dangers in labour. HUGH R. ARTHUR, F.R.C.S.(E.), M.R.C.O.G. Newcastle-upon-Tyne, England.

SPECIAL CORRESPONDENCE

The London Letter

(From our own correspondent)

SPECIALISTS' SALARIES

Details have now been published of the proposed salaries and conditions of service for specialists in the National Health Service. Whole-time specialists are to receive salaries rising from £1,700 at the age of 32 years to £2,750 at the age of 40. In addition, special distinction awards are to be made as follows: 4% of specialists are to be entitled to an award of £2,500 per annum in addition to their salary, 10% are to receive £1,500, whilst 20% are to receive £5,500. Superannuation is also to be provided, 8% of the salary being contributed by the employer and 6% by the employee. The annual holiday is six weeks. The rate for part-time specialists is based upon a formula recommended in the Spens Report, upon which the present proposals are based. The maximum remuneration for a part-time specialist is $9\frac{1}{2}$ elevenths of the salary appropriate to the grade. Somewhat similar grades of salaries are to be paid to whole-time clinical teachers; professors of clinical subjects, for instance, are to be paid at the rate of £2,500 to £2,750 per annum.

On the whole these proposals have been favourably received, but there has been some criticism of the conditions with which whole-time specialists are expected to comply. One of the more fundamental criticisms of the proposals is the extent to which they differ from the remuneration offered to general practitioners. This last point, however, has been taken up by the British Medical Association at a recent special representative meeting at which a recommendation was accepted asking for a further allocation of £16,500,000 to be made available to increase the payments to general practitioners. Almost simultaneously the estimates for 1949-50 have been presented to the House of Commons. These show that the cost of the national health service, national insurance and national assistance services for the coming year will be £555,358,000, of which practically £260,000,000 is for the national health service.

ARTIFICIAL INSEMINATION

The useful function subserved in this country by the House of Lords was recently well exemplified when a full-dress debate took place on the subject of artificial insemination. That the position requires clarification is demonstrated by a recent case in which a decree of nullity was granted although a child had been born of the marriage by artificial insemination by the husband. As the law holds that a child born of a marriage where there is subsequently a decree of nullity, becomes illegitimate, the present position would be farcical were it not so tragic. The Archbishop of Canterbury, speaking for the Church, stated dogmatically that artificial insemination by a donor is adultery, but that artificial insemination by the husband is not contrary to Christian standards. Lord Merriman, a distinguished Law Lord, held that artificial insemination by a donor was based on fraud and drew attention to the genetic problem involved if it were practised on a large scale. Apart from a small, if vocal, minority, there is little doubt that in this instance these distinguished luminaries of the Church and of the Law represent the opinion of the people of these Islands.

SEXUAL OFFENDERS

The report just published by a joint committee of the British Medical Association and the Magistrates' Association recommends changes in the legal procedure for dealing with sexual offenders which should go far to bring the law into line with current medical thought. The emphasis throughout is on the uselessness of punishment without treatment. When imprisonment is imposed, short-term sentences are considered unsound as they give no time for curative treatment and are useless as deterrents. In the case of homosexuality the opinion is expressed that English law should be brought into line with that of most European countries and that homosexual conduct in private between consenting adults should be no concern of the law. In cases of offences against children it is recommended that these should be tried at a juvenile court or that two magistrates experienced in juvenile court work should sit on the bench with the presiding judge. Another recommendation is that when a sexual offender has been convicted it should be compulsory for the advice of a duly qualified medical practitioner to be sought.

B.C.G. VACCINATION

At long last the Ministry of Health is evolving a national plan for studying the value of B.C.G. vaccination. The first trial will take place in Edinburgh where the Town Council has agreed to a request from the medical officer of health that the approval of the Department of Health for Scotland should be obtained for a scheme which will cover children of infected families and students and nurses coming into contact with tuberculosis. In view of the fact that the procedure has now been made compulsory in Scandinavia,

it appears rather late in the day for such a tentative approach to be made to the problem in this country. On the other hand, all those who are convinced of the efficacy of B.C.G. vaccination in selected cases are only too thankful that its use has now been permitted—even if only on a small scale.

MEAT

The reduction recently in the weekly allocation of meat to 10d. per head is a melancholy commentary upon the present food situation in this country. The effect will be widely felt, and even the temporary freeing of milk from rationing will scarcely compensate for this further deprivation of essential protein. Even in 1947, the latest year for which full figures are available, the consumption of meat had fallen by 2,000,000 tons in spite of the fact that the population had increased by some 2,000,000, and the meat consumed per head of the population was 77 lb., compared with 119 lb. in 1937. When it is realized that the comparable figures for Canada are 116 lb. in 1937 and 135 lb. in 1947, whilst in the United States the figures are 125 lb. and 155 lb., it is not difficult to appreciate the intense disappointment which this latest cut has caused throughout the country.

WILLIAM A. R. THOMSON

London, April, 1949.

The Australian Letter

(From our own correspondent)

At the moment of writing things have taken a decisive turn in the introduction of the Federal Government's free medical care scheme. The Minister for Health, who is a lawyer, announces that he is contemplating prosecuting doctors who will not work the scheme. The press reports long Cabinet meetings to consider what they can do to break the "deadlock", with the B.M.A. It is suggested that this state of affairs has been brought about through the attitude chiefly of the New South Wales division of the British Medical Association. Nothing could be further from the truth, for all states are agreed on the futility of trying to work under a set of regulations which have never passed Parliament, but are to be implemented at the will of the Minister.

On the political side it is rumoured that the Minister for Health is in hot water with his back benchers, and that he may not even be renominated in the next Federal election in his riding in Tasmania. While all this speculation goes on, and new threats appear daily in the press, there is still a lamentable lack on the part of the profession—they simply have not put up a workable scheme to the public, explained it to the public and stood by it.

The free drugs scheme instituted last June has hardly been used, since only 122,000 prescriptions have been written on the now-famous Government forms and within the limited Government formulary.

CARE OF THE AGED

The Hospitals Commission of New South Wales has recently opened at Bathurst, a new settlement of cottages and dormitories for the care of the aged. These Macquarie Homes, as they are called, are based on the very sound principles of married aged couples being enabled to live together, and that all old people shall eventually be able to live in their own districts where they may maintain contact with their relatives or friends. A modern communal kitchen will provide the meals, and thus insure that dietary deficiencies, so common in this aged group, shall not occur for lack of proper cooking facilities. The new venture will be administered by the Bathurst District Hospital Board for the central Hospitals Commission. Amenities will include a library and a film theatre.

CHILD CENTRES

This correspondence could not be concluded without mentioning the Lady Gowrie Child Centres in the capital

cities of each state. These study centres for normal children are one of the finest research institutions in the country. Founded by the Federal Government in 1939, the Sydney centre is located in a new housing development in a very old part of the city. One hundred children from the housing settlement are taken in as day students, but hundreds more would like to come. The centre is run as a demonstration to all communities of what can be done to aid in the normal psychological growth of children in otherwise unfavorable environments.

In addition, a very broad programme of nutritional research has been carried on through these centres from the Institute of Anatomy in Canberra. Posture, skeletal development, the incidence and duration of all neighbourhood infections are all charted, and make an interesting social study. The early recognition of psychological misfits is another useful function, though the centres are in no sense child reformatories or psychiatric clinics. Gradually there is being built up a picture or norm of the average Australian child, whose diet is known, whose home circumstances are known, and whose day to day health status is recorded. It is hoped that the Sydney unit will be attached to the Chair of Child Health which the Commonwealth Government has recently created at the University of Sydney, with an annual subsidy of £10,000.

MEDICAL EDUCATION

In conclusion your correspondent can summarize his year in Australia with the following medical comments. Medical education presents here, as elsewhere, a very grave problem insofar as adequate financial support is concerned. Entrance to medical school is on a selective basis in all but the University of Sydney, where a High Court decision forced the University to take into medical school all who had matriculated and desired entry. Consequently the impossible number of 600 students in first year has to be "processed", with 32 to a cadaver, and in the later years 25 to a bedside. Research is supported by only a few private bequests, considering the wealth of the country. The national Health and Medical Research Committee, which is Federal, does a great deal for medical research with its limited budget, and has had the foresight to enter into three-year agreements with some of the laboratories concerned in order that a team can be kept together long enough to enable something really solid to be produced. The orientation of medicine is still around the British tradition, and with dollar shortages the British influence will increase. Journals cannot be easily imported from North America, nor can textbooks beyond a certain quota. Postgraduate students naturally flow to England rather than to dollar areas. The Royal Colleges of Physicians and Surgeons and the developing Postgraduate Committees of the universities are leading in the further development of Australian medicine.

February 24, 1949.

WM. C. GIBSON

The New Zealand Letter

(From our own correspondent)

In one brief letter it is possible to give only the essentials of the New Zealand scheme. Readers are referred to an editorial on this subject in this *Journal*, 57: 65, 1947.) No mere recital of the legislation and of the benefits promised in the scheme will suffice if Canadians want to get a true picture of the functioning of the scheme. It is the unpredictable and sometimes objectionable by-products of its functioning which are the important observations to be made, and for this reason the present letter deals with them in detail.

Origin.—At the General Election of 1935 both major parties put forward the doctrine that the health services of the community were the proper concern of government and that legislation to spread the risks and costs of illness was desirable. The party elected set up a "Commission" of its own members only, to frame a bill. After rather sterile negotiations with the B.M.A., legislation was precipitately introduced as part of the very broad Social Security Act of 1938.

Services.—In order of implementation, the benefits were: free mental hospital treatment for all (1939); maternity service, in which the general practitioner receives £6-6-0 per case carried, with certain extra fees in case of complications requiring extra care; a separate scale of fees for certified specialists in obstetrics obtains also. The hospital bills of the maternity case are largely paid for by the scheme (1939); free hospitalization in all public hospitals including outpatient services, x-ray and physiotherapy (1939); free pharmaceuticals from a very broad formulary (1941); free diagnostic and therapeutic radiological services for patients hospitalized in public institutions, and at half cost for non-public cases (1941); general practitioner service with the doctor receiving 7/6 per office visit. The doctor can collect this fee directly from the government, or the patient can pay the doctor's fee (usually 10/6) and get a refund through the post-office of 7/6. The scheme began as a capitation plan but so few doctors were willing to work under that method of payment that it was changed to fee for service. Nearly all general practitioners in New Zealand are working under this plan today (1941). Free physiotherapy to patients in public hospitals, or at half price to private cases (1942). District nursing services (1944). Clinico-pathological services when requisitioned by a doctor. The hospital or the private pathologist is paid in full per service rendered (1946); dental benefits for children aged approximately 10 to 16 years, on a fee for service basis approved by the New Zealand Dental Association (1947). Artificial aids such as contact lenses, hearing aids and artificial limbs (1947).

Finance.—Since 1939 a Social Security Tax (now one shilling and sixpence in the pound) has been collected to pay for hospital, medical and pharmaceutical benefits, family allowances, old age, widow's, orphans' and invalid pensions, etc. This tax yielded in 1947-48 £26,176,635, or 21% of all tax receipts in New Zealand. To this sum was added £16,000,000 from consolidated revenue for 1947-48, in order to meet the astronomical social security budget of £47,000,000. Of this budget, £7,021,488 went to medical benefits of all types. The breakdown of this figure, in order of size of the main components is interesting:

General practitioner service	£2,167,826
Hospitalization benefit	1,949,489
"Free" drugs	1,558,350
Maternity benefits	800,030
Radiological services	209,059
Dental services	105,109
Laboratory services (since 1946) ..	90,306
District nursing service	82,756
Massage and physiotherapy	47,510
Artificial aids	8,067

Administrative costs were met by the Social Security Fund as a whole, and were approximately £800,000 for the entire program, which as stated above includes pensions, superannuation, etc.

For a total population of 1,802,637 (1,696,188 Europeans and 106,449 Maoris) the medical bill was approximately £4 per capita per year.

Criticisms.—The greatest medical lack in the scheme is that no provision is made for specialist services.* As to the day-to-day working of the scheme, a premium is set on "seeing" up to 100 patients per day in office visits, in writing prescriptions at 7/6 each, and in issuing pieces of paper directing patients to casualty departments of hospitals should even minor dressings be needed. "Bottle medicine" is rampant, and very large incomes are available to rapid therapists, not to diag-

* Visiting staff at public hospitals are now paid £300 to £500 per year, thus ending the honorary system. In-so-far as these doctors may be specialists, it can be said that specialist care is available to patients in public hospitals, but the service depends on the remote possibility of getting a bed due to the present extreme shortage of accommodation.

nosticians. The lack of men going in for postgraduate training is alarming to most thinking New Zealanders, and recruits for such highly necessary services within the scheme itself as radiology and pathology, not to mention teaching, are unlikely to be found in the face of the demoralizing incidence of monetary rewards at present. The barbiturate consumption is at an all-time high, and is proving a bonanza to manufacturers of such drugs. As can be seen from the above table of expenditures, the drug bill for the country is approaching the total bill for medical care. This means that for every 7/6 visit to the doctor, the patient averages a prescription worth 5/6, and this accurately reflects the type of medicine which is in the ascendancy today in New Zealand. The costing of prescriptions alone requires a staff of over 100.

The government favours the "Direct Claim" plan (whereby the doctor fills in the required forms and claims directly for his services from the Treasury) because it reduces greatly the number of cheques to be sent out monthly. Where patients have sent in the forms under the "Refund Method", 30% of the papers have been filled in incorrectly, thus further adding to the cost of dealing with millions of separate accounts and claims. The B.M.A. does not favour the plan whereby the doctor makes a "direct claim" on the government, because it breeds irresponsibility in patients who tend to visit the doctor knowing that the onus is on him to fill in their forms for them if he is to get paid. The "direct claim" plan further leads to over-visiting by doctors, who have merely to bombard the Treasury with forms countersigned by the patient.

It is understood that a committee has reported to the Parliament on methods of correcting abuses, of disciplining doctors through a committee of the profession, of paying all accounts through "refunds" to patients, not to doctors, of paying certified specialists on a fee for service basis, and of charging non-hospitalized patients a portion of the cost of their drugs in order to curb present excesses.

The best parts of the scheme are as notable as are the weaknesses. The free choice of doctor has been maintained, payment is for services rendered, there is no means test, and through graded taxation the load is as equitable for a poor man as for a rich man. Any doctor can participate in the scheme, and this entails no loss of freedom to practise in the traditional manner and in a strictly confidential relationship with the patient. No contract is required of any party. The maternity benefit is the most popular in the whole scheme, and is highly regarded by all parties. Other highly commendable services are those of the district nurses, who do so much to relieve the load on hospital beds; physiotherapy (which, properly prescribed may well restrict the field of chiropractors in all countries), the laboratory and radiological services, the recently instituted dental services, and the provision of artificial aids.

WM. C. GIBSON

Auckland, N.Z.,
March 1, 1949.

The Holland Letter

(From our own correspondent)

THE POPULATION OF HOLLAND

The population of Holland is 9,500,000, the 1930 census showing a threefold increase within a century. The high birth and low death rates make for an average increase of 100,000 a year. The density of population is 723 per square mile, compared with 273 for the State of New York (the highest figure of any State in the U.S.A.) and 512 for Great Britain. The high rate of increase creates many problems, the most urgent of which is accommodation. The young workers are absorbed mainly in industry, trade and transport, agriculture playing only a relatively small part. Contrary to general impressions abroad, Holland is not primarily an agricultural country. It is true that agri-

culture, dairy farming, horticulture and fishing add to the general prosperity, but the increase in arable land (reclamation of the Zuyder Zee) cannot possibly cope with the increase in population. Holland thus takes a large part in the world's trade and transport and since the healthy growth of the population provides one of the natural factors for the development of industry, industrialization is proceeding rapidly.

Although small in number, the Dutch are ethnographically variable. The countries lie in the bend of the wide track of emigration in past ages. The earliest inhabitants were the Celts, who in time were absorbed by the Frisians, Saxons and Franks, though certain Celtic characteristics were retained. The Saxon type prevailed most in the north and east, whilst Franks were most noticeable in the south. Differences can still be noted in language, type and build. Abroad, the Dutch are traditionally assumed to be big and fairhaired with blue eyes. Foreign visitors are therefore surprised when they find this is not generally the case. In the north now live the big, fair, reticent Frisians, in the south the small, dark exuberant inhabitants of Brabant. The Frisians have their own language and literature, both of which are carefully preserved. Other influences were derived from the Jews, French (Huguenots), Walloons and Flemings who, to escape persecution in their own countries, found refuge in freedom-loving Holland. This "open-house" policy to refugees reaped its reward in the innovation of new industries and craftsmanship.

Births	Deaths	Marriages
1938: 20.5 p. 1,000	1938: 8.5 p. 1,000	1945: 7.8 p. 1,000
1946: 28.6 p. 1,000	1946: 9.40 p. 1,000	1938: 7.7 p. 1,000

PRODUCTION OF INFLUENZA VACCINE IN THE NETHERLANDS

In the biological and chemical laboratories of a firm at Weesp (near Amsterdam) the preparation of vaccine against influenza has lately been started, on the basis of what America, England and the Netherlands have already achieved in this field. There are several kinds of influenza which are generated each by its own virus and for this reason the Weesp firm, following the example of America, have prepared a vaccine (standard) which contains more than one virus vaccine.

In the Netherlands the preparation of vaccines and sera is only permitted to the Rijksinstituut voor de Volksgezondheid (National Institute for Public Health) and permits for the manufacture of these products can only be given by Ministerial order. After ample discussion the Minister of Social Affairs has now granted such a permit to the Weesp firm which will be the first in Europe to produce the influenza vaccine on an industrial scale.

OPERATION TRANSMITTED BY TELEVISION

For the first time in Europe an operation has been transmitted by television from the University Hospital at Leyden. The television picture was cabled to the large lecture room of the hospital, where two hundred doctors witnessed this demonstration. The very clear picture was projected on two screens of 1.30 metres (4.26 ft.) by 1 metre (3.28 ft.), the largest screen ever used for this purpose up to now.

ARTIFICIAL HEART

Based on the data from experiments in dogs with a mechanical heart-lung-device, which takes over the whole function of the heart and lungs, Prof. Dr. J. Jongbloed from the University of Utrecht, constructed a mechanical heart-lung-system with the capacity for use in man. The most important part is a new type of artificial lung: the spiral oxygenator. In experiments on dogs of more than 30 kg., in which only the half of the apparatus was in use, this new heart-lung-device proved to justify all expectations. Further experiments with this apparatus are in progress.

SOCIAL INSURANCE

The first step towards social security was the Employers' Liability Act of 1901, which insured workers against financial consequences of accidents incurred during employment. Since then a number of other social laws have been passed, many of which are now being adapted to modern needs. They cover accident, illness, disability, old age, the care of widows and orphans, and will very soon include unemployment. In 1946, 40% of the population participated in a compulsory health insurance scheme providing for medical and hospital treatment. Another 25% voluntarily took part in this scheme. The law at the moment guarantees the worker 80% of his wages for 52 weeks continuous illness, after this period a disability annuity may be accorded. Further reaching provisions are now under discussion.

HOUSING

Government supervision of building has done much to contribute towards the health of the people. The Housing Act of 1901 provided for slum clearance and an increased standard of living conditions. Before the war there was a yearly average increase of 37,000 newly built houses. This was adequate for all requirements. The present shortage, estimated at 300,000 homes, is a serious social problem which has not yet been solved.

J. Z. BARTCH

ABSTRACTS FROM CURRENT LITERATURE

Medicine

Arachnidism. Effect of Calcium Gluconate in Six Cases. Greer, W. E. R.: *New England J. Med.*, 240: 5, 1949.

The widespread distribution in the United States of the black widow spider (also reported in the interior of British Columbia—abstract.) is emphasized, and the author expresses the opinion that it is greatly increasing in numbers and invading large cities, being found in greatest numbers in the vicinity of human habitations, even high in office buildings. Knowledge of its habits and the effect of its bite is important as many victims have been subjected unnecessarily to surgical interference on account of the close resemblance of its symptoms to those of acute surgical conditions of the abdomen. Excruciating abdominal pain may be the most conspicuous symptom. The appearance and habits of this spider are minutely described. The syndrome consists of severe and transient pain at the site of the bite; rapid local oedema and redness usually; a centrifugally spreading burning sensation involving the entire body and lasting 20 to 30 minutes; sudden cramp-like pain involving the abdomen, and often in legs, arms and back; headache, nausea and vomiting; burning in the soles of the feet. This last feature is of great importance because when the bite is not recognized as such it may be pathognomonic. In all 6 cases treated by the author relief followed soon after the intravenous injection of 10 c.c. of 10% calcium gluconate solution followed by a saline infusion containing 10 c.c. of the same solution.

D. E. H. CLEVELAND

Anicteric Hepatitis. Zimmerman, J. J. and Thomas, L. J.: *Am. J. M. Sc.*, 216: 545, 1948.

Pointing out that the cases of this condition which have been reported in the past have been discovered during outbreaks of jaundice, these authors present nine occurring sporadically among routine hospital infectious disease admissions. The general clinical picture was that of a systemic disease with predominantly

abdominal localization, the onset being either with chills or chilly sensations with headache and occasionally sore throat but without notable respiratory features. Outstanding in the symptoms were anorexia together with abdominal soreness with, at times, intolerance to even the slightest pressure on the epigastrium. Flatulence, while rare during the febrile period, was always noted within a few days of the onset. Enlarged lymph nodes were present in seven of the nine cases, five cervical in site and two generalized. The upper abdomen was tender, particularly in the right upper quadrant, and the liver was enlarged in all cases. The white blood count was normal or slightly depressed. The urine urobilinogen was elevated in all cases. In seven of the nine there was no elevation of the blood bilirubin or the icteric index. The bromsulphthalein, the cephalin flocculation or the thymol turbidity tests were elevated either singly or in combination in support of the diagnosis.

It is of interest that during the onset phase of the illness the abdominal features were not as marked as they became later, suggesting a parallel between the early febrile and the later icteric phases of the more common, overt form of acute hepatitis. In eight of the nine cases followed, three were well both clinically and in terms of laboratory findings in five to eight weeks; two continued to show laboratory abnormality of a mild character; the remaining three ran a subacute or chronic course, still showing clinical and laboratory disorder after twenty weeks in one case and five months in another.

The authors point out that in cases of anicteric hepatitis the mildness of the symptoms and the absence of icterus predispose towards letting the patient up and about too early with a resulting tendency to relapse.

G. A. COPPING

Hypertension and the Amount of Cardiac Hypertrophy.

Stein, B. R. and Barnes, A. R.: *Am. J. M. Sc.*, 216: 661, 1948.

In an attempt to throw further light on the question of the effect of hypertension upon the heart muscle these workers studied the findings in 111 cases in which the records of the Mayo Clinic extend back to the time before the patients' blood pressures began to rise and in which the cases were eventually followed to autopsy after numerous clinical observations had been made upon them. The findings appear to indicate that cardiac hypertrophy is more directly related to the severity of the hypertension than to its duration; it appeared that a relationship between the duration and the amount of induced hypertrophy existed only in the cases of severe disease. A further finding of interest was that the women of the series stood their hypertension better than the men both in terms of longer duration of life and in lesser cardiac hypertrophy.

G. A. COPPING

Massive PicROTOXIN Therapy in Treatment of Acute Barbiturate Poisoning.

Newman, E. A. and Feldman, M. Jr.: *Arch. Int. Med.*, 81: 690, 1948.

The authors have used massive doses of picROTOXIN in the treatment of 30 cases of acute barbiturate intoxication. Owing to difficulty in getting accurate histories, the severity of the poisoning usually has to be determined by initial observations including blood pressure, estimation of respiratory exchange, extent of pharyngeal or tracheal obstruction, cyanosis, state of reflexes.

Not infrequently artificial respiration was necessary. Gastric lavage was usually carried out even when the poison had been taken many hours previously and a saline cathartic put in the stomach at the same time. Penicillin therapy was routine before any fever or sign of pulmonary involvement could be present. Likewise frequent turning of the patient in bed, adequate air way, either nasal or endotracheal. PicROTOXIN was the key-stone of the treatment; initial dose from 9 to 45 mgm. every fifteen minutes intravenously. Once the intra-

venous treatment started all the drugs were administered by this means. Muscular twitching once obtained was maintained by massive doses, since any relaxation of effort always resulted in serious deterioration of the patient. Amphetamine is advocated as an auxiliary drug, having a selected action on the cerebral cortex. Metrazol was used to estimate the depth of coma, the yardstick being the amount necessary to produce a response such as muscular twitching. Peripheral collapse was treated with plasma, NaCl, whole blood transfusions. Desoxyephedrine hydrochloride was found to be a good stimulant when blood pressure became alarmingly low.

Two cases of very severe poisoning are reported who recovered in spite of extensive bronchial pneumonia with empyema as an additional complication in one case.

P. M. MACDONNELL

Symptomatic Treatment of Certain Types of Chronic Headache.

Friedman, A. P., Brenner, C. and Carter, S.: *J. Am. M. Ass.*, 139: 195, 1949.

Five hundred and twenty-one patients with psychogenic and post-traumatic headaches were treated, 494 by a combination of psychotherapy and pharmacotherapy and 27 by psychotherapy alone. The drugs used included analgesics, vasoconstrictors, vasodilators, hormones combined with vitamins, placebos and parenterally administered isotonic sodium chloride solution. The best results in each group of patients were obtained by the use of analgesics. The other drugs gave no better results than those obtained by the use of inactive substances.

The results reported strongly suggest that in cases of psychogenic and post-traumatic headaches the effectiveness of symptomatic treatment was primarily caused by the patient's psychologic reaction to the treatment situation in general and in particular to having received a "remedy" from the physician. Evidence for this was the fact that almost equally good results were obtained by the use of placebos.

The similarity of results of drug therapy in patients with post-traumatic and psychogenic headaches that the mechanism of production of the two types of headache are closely related and probably are similar responses of the body to disturbing psychologic stress.

J. PRESTON ROBB

The Effect of Injury to the Spinal Cord and Cauda Equina on the Sexual Potency of Men.

Munro, D., Horne, H. W. and Paull, D. P.: *New England J. Med.*, 239: 903, 1948.

Study of a large series of male patients with spinal cord injuries indicates that erection, ejaculation and impregnation are possible unless there is a destructive lesion of the sacral cord, a transection of the cauda equina or an extensive injury to the cord between the sixth thoracic and third lumbar segments sufficient to completely interrupt the thoraco-lumbar sympathetic outflow.

NORMAN S. SKINNER

Diphtheritic Myocarditis.

Boyer, N. H. and Weinstein, L.: *New England J. Med.*, 239: 913, 1948.

A true estimate of the occurrence of myocarditis with diphtheria cannot be made unless frequent electrocardiograms are taken throughout the course of the disease. Electrocardiographic abnormality may be evident within a few days of the onset or not until after several weeks and may be very transient. Of 93 patients with diphtheria having at least five electrocardiograms 61 cases showed abnormal tracings. Borderline tracings were found in about half of the remainder. While the more severe electrocardiographic changes paralleled an increasing mortality rate autopsy findings indicated that damage to the myocardium occurred with less marked changes and fibrosis was evident even when the electrocardiogram had returned to normal prior to death.

Diphtheria probably very frequently causes damage to the myocardium which hastens the onset of clinical

heart disease in later life. In the majority of cases of acute diphtheritic myocarditis fibrosis is probably well established in about three weeks but it is probably wise to interdict severe physical exertion for about six months.

NORMAN S. SKINNER

Surgery

Fistula Between the Rectum and Urinary Tract.

Wyndham, N.: *Brit. J. Surg.*, **36**: 175, 1948.

Of the fistulae due to injury, those between rectum and ureter are rare and may necessitate nephrectomy. Traumatic rectovesical injury is often due to an operation and one-third heal spontaneously. Suprapubic cystotomy is often essential, and the passage of faeces controlled either by conservative means with diet, drugs and sphincter ani dilation, or by colostomy. Direct operative measures are sometimes necessary. Recto-urethral fistulae are more accessible to operative cure.

When the cause of the fistula is due to inflammation or new growth rather than trauma, diverticulitis, syphilis, tuberculosis and growths originating in either the bladder or the rectum may be etiological. In the case of cancer, no treatment is likely to cure. Cystotomy and colostomy may suffice for healing if not cancerous. Or the fistula may close if lavage of the bladder and bowel be carried out.

BURNS PLEWES

Polypoid Lesions of the Colon and Rectum. Scarborough, R. A. and Klein, R. R.: *Am. J. Surg.*, **76**: 723, 1948.

About 5% of polypoid lesions are not premalignant: fibroma, myoma, endometrioma, haemangioma, granuloma (amœbic, tuberculous, foreign body), lymphoid and lymphoma. The rest are considered premalignant: inflammatory hyperplasia (as in chronic ulcerative colitis), hyperplasia (doubtful), adenoma, papillary adenoma. In a series of 458 patients (none with frank carcinoma) the age incidence of polypi was found to be high in the 1st and 3rd to 7th decades. X-ray diagnosis is about 90% accurate in well advanced carcinoma of the colon, but the demonstration of polyps is much less well accomplished and several barium enemas with air contrast examination are often necessary. Bleeding from diverticulitis may occur, but it is more likely to be from a co-existing adenomatous neoplasm.

All polypoid lesions of the colon and rectum should be discovered and eradicated, but they are asymptomatic till ulcerated or obstructing. If one is demonstrated, others should be suspected. The entire lesion must be examined by the pathologist for accurate diagnosis. After removal of a polyp or carcinoma, periodic sigmoidoscopy and x-ray examination should be done whenever signs or symptoms suggest a new lesion.

BURNS PLEWES

Posterior Sphincterotomy. Whitney E. T.: *Am. J. Surg.*, **75**: 761, 1948.

A description of the anatomy of the sphincter ani, the posterior Minor's triangular space, and the common but pathological pecten band is presented. Cryptitis and its complications: fissure in ano, fistula, perianal abscess, and strictures about the anus, may be relieved by pectenotomy and severing the superficial portion of the sphincter ani at the posterior commissure. It is argued that all hæmorrhoidectomies should be accompanied by posterior sphincterotomy. Such a procedure prevents false re-appositions and therefore stricture, diminishes postoperative œdema and therefore pain, abolishes external sphincter spasm, lessens postoperative skin tags, enables a pressure dressing to prevent oozing. In only two conditions is posterior sphincterotomy avoided: ataxic sphincter and absent anorectal angle.

BURNS PLEWES

Radical Mastectomy. Atkins, H.: *Brit. J. Surg.*, **36**: 87, 1948.

Radical mastectomy is the treatment of choice for early carcinoma of the breast, and the procedure should be as safe and curative as possible: all skin within two inches of the lump, all breast tissue, all axillary lymph-nodes and fat excised, deep fascia must be removed. It is better that the operation be nearly bloodless, that shoulder movement be preserved and lymphœdema of the arm be avoided. The author has devised several modifications the better to attain these objectives.

Infiltration of the skin with 1:500,000 adrenaline enables the bloodless reflection of skin-flaps and easier finding of the right layer. The medial skin-flap is not dissected till the end of the operation to reduce blood and heat loss. The steps of the operation are discussed and described. Raw areas are covered by split-skin stamp grafts and the axillary dead space is obliterated by a cotton-wool snowball.

BURNS PLEWES

Trauma of the Hand. Duncan, J. McK.: *Brit. J. Surg.*, **35**: 397, 1948.

In reporting 42 cases of flexors of the fingers divided within their sheaths, several conclusions regarding time of suture, technique, free grafts and splinting are presented. The cut sublimis tendon should not be repaired at primary operation. All profundus tendon lacerations should be repaired except when divided alone over the proximal phalanx or base of the middle phalanx where adhesions will prevent proximal interphalangeal joint movement. When both sublimis and profundus tendons are cut, as is common, the sublimis tendon should be excised from its insertion to above the sheath and the profundus repaired. Positioning after repair should ensure that the tendon repair is not in direct contact with other soft tissue wounds and relaxation of the affected muscle. The former cannot be done when the tendons are cut in a position of extension and free grafts must be used. Delayed repair must be done after 4 to 6 weeks and before degeneration of the muscle; 50% good results attend primary repairs and freeing of adhesions is often necessary.

Tears of the extensor tendon around the terminal interphalangeal joint should be subjected to operation when there is full flexion and no extension at that joint. Plaster treatment alone gives good results in only about half the cases. The types of tearing vary. When synovial damage occurs, results are poor. The indications for and technique of operation for mallet finger are described.

BURNS PLEWES

Obstetrics and Gynæcology

Cough Fracture in Late Pregnancy. Paulley, J. W., and Lees, D. H. and Pearson, A. C.: *Brit. M. J.*, **1**: 135, 1949.

A brief review of the literature of cough fracture is given, with particular reference to its incidence in late pregnancy. The clinical picture usually found in this condition is described. Brief histories of four cases are reported. Suggestions are made about the mechanism of the condition. A case is put forward for this rather trivial injury to be regarded more seriously and a suggestion is made that its frequency may be greater than is generally recognized.

ROSS MITCHELL

Pregnancy Complicated by Diabetes Mellitus. Barns, H. H. F. and Morgans, M. E.: *Brit. M. J.*, **1**: 51, 1949.

A series of 58 diabetic pregnancies in 45 patients is reviewed. In the majority of patients the carbohydrate tolerance was found to diminish as pregnancy advanced. In some, however, it increased prior to delivery, and it is possible that œstrogens given thera-

apeutically may have been a factor in this improvement. The tendency of the pregnant diabetic to develop hydramnios is confirmed. It was found that hypoglycaemic symptoms and coma tend to occur in early pregnancy, and ketosis and diabetic coma in the latter part of pregnancy. There is a greater tendency for the diabetic to develop late pregnancy toxæmia than the non-diabetic, and the relative incidence varies with the standard of severity of the toxæmia taken for comparison.

The maternal prognosis is good, and pregnancy does not make the diabetes worse provided that it is well treated. The late fetal mortality was 55% in a first series of 43 pregnancies. In a second series of 15 pregnancies in which oestrogens were given there were only 3 deaths, (20%). The cause of the fetal mortality is discussed, and it is suggested that the factor affecting the viability of the fetus probably arises in the maternal anterior pituitary lobe. The incidence of abortion does not appear to differ from that of non-diabetic pregnancies, and suggests, first, that diabetes mellitus is not a cause of abortion, and secondly, that the factor which reduces fetal viability exerts its strongest influence towards the end of pregnancy. Congenital deformities, gigantism and hypoglycæmia of the newborn are briefly discussed, and it is suggested that the tendency to gigantism is due to an excess of the growth hormone from the maternal pituitary gland.

ROSS MITCHELL

The Use of Methionine in Obstetrics. Philpott, N. W., Hendelman, M. and Primrose, T.: *Am. J. Obst. & Gyn.*, 57: 125, 1949.

Studies in the use of methionine have been carried out in four obstetric complications. The results have been most promising but not conclusive. In the treatment of toxæmia and hæmolytic disease of the newborn, it is a valuable adjunct to other proved types of therapy. The hepatorenal syndrome can be best treated with the combined use of plasma, whole blood and methionine. This investigation merits further study.

ROSS MITCHELL

Dermatology

Undecylenic Acid Given Orally in Psoriasis and Neurodermatitis. Perlman, H. H.: *J. Am. M. Ass.*, 139: 444, 1949.

The spontaneous recovery after puberty of scalp ringworm has been shown to be due to the appearance in the sebum of saturated and unsaturated fatty acids of low boiling point, not found present in significant quantity before puberty. These fatty acids have a selective fungistatic and fungicidal action, hence they are used with some success, topically applied, in the treatment of scalp ringworm. Perlman used one of these acids, undecylenic acid, orally, in children for the same condition. Improvement but no cure was obtained, but a profuse desquamation of the scalp was constantly observed. This prompted Perlman to try the treatment in psoriasis in a series of 18 cases, all, with one exception, adults. In 16 cases the eruption was of the chronic generalized type and in one only was the eruption confined to the scalp; 3 cases cleared completely in from 14 to 168 days; 6 cases showed 75% disappearance of the lesions and in 9 cases there was 50% disappearance. Chronic indurated localized patches on elbows and knees were very slow to respond contrasted with the disseminated eruption. The dosage was 5 perles each containing 0.5 gm. of the acid 3 times daily. The total daily dose of 7.5 gm. was gradually increased to 10 to 15 gm. daily, in divided doses. Although the drug has been found relatively non-toxic to experimental animals, unpleasant reactions in the form of nausea, vomiting, burning sensation in the epigastrium, eructations with unpleasant ("rotten herring") taste were not rare. These symptoms could be prevented or relieved by carbonated

drinks, soft drinks or sodium bicarbonate in water and it is suggested that they might be altogether obviated by using enteric-coated perles; 8 cases of lichen simplex chronicus (circumscribed neurodermatitis-Brocq) were also treated with much smaller doses of undecylenic acid with good results. Perlman very properly considers that the number of cases is too small to justify definite claims for the value of this remedy, further scientific research remaining to be done, and cautions against its general use, and that when it is used frequent urinalysis and complete blood counts should be done.

D. E. H. CLEVELAND

Psychology

Psychodynamic Mechanisms in Neurodermatitis. Miller, M. L.: *Psychosom. Med.*, 10: 309, 1948.

This is a detailed report of the psychoanalysis of a case of neurodermatitis. It sheds further light on the psychodynamic factors important in some skin disorders and it illustrates the benefit which can sometimes be obtained through psychoanalysis. It does not make a direct contribution to the handling of these difficult cases by general physicians.

W. DONALD ROSS

Review of Psychiatric Progress 1948. *Am. J. Psychiat.*, 105: 497, 1948.

This is the usual annual review of psychiatry published by this journal. Except for the notable omission of psychoanalysis it appears quite complete and it is very much worth reading by anyone wishing a brief comprehensive summary of recent advances in psychiatry. Each of the 21 authors is a recognized authority in the field with which he deals. Only very general trends will be mentioned here with some individual items of interest for physicians in other fields.

Research in heredity has been moving away from purely genetic determination of schizophrenia and mental retardation but there have been important contributions supporting the inheritance of some neurological disorders and to the substantiation of genetic factors in hypertension and nephrosclerosis, which should be borne in mind, along with other factors, by those at present emphasizing psychosomatic determination. Progress has been made in nerve cell metabolism, especially with reference to proteins and polynucleotides, but the use of malononitrile, which stimulates the production of protein substances in nerve cells, has not yet been proved to be more effective in the treatment of psychoses than other methods of shock treatment, to which its use bears a resemblance. Electroencephalography has been contributing to the recognition of frequent involvement of the brain in many general somatic diseases and even to the perplexing discovery that allergic children often show cerebral dysrhythmia, especially if they have a positive family history of allergy. It is also leading to considerable speculation about electrical "feed-back" theories of human behaviour. Psychological testing is making continued progress in the assessment of qualitative aspects of personality and in the recognition that intelligence is a dynamic rather than a static entity. There is a growing acceptance of mental hygiene measures in education at all levels. Sociological factors in human adjustment are being studied increasingly as well as psychopathological factors in social adjustment. The "psychosomatic" approach is giving increasing attention to psychological mechanisms and physical remedies, without losing sight of the patient as a person. Group psychotherapy is being applied more widely especially in mental hospital treatment. Psycho-surgery is still spreading, with both refinements and regressions in technique, and an increasing effort to examine the results objectively.

Penicillin alone is now considered just as effective for treating neurosyphilis as penicillin plus malaria, except that the former treatment is slower in taking

effect and the patient or others may suffer in the meantime more than is justified by the decreased risk. There appears to be a limited place for electroshock therapy of some patients with general paresis. Contributions to the understanding of alcoholism have come from sociological studies, from psychoanalysis, and from increasing co-operation between psychiatrists and Alcoholics Anonymous. Geriatric psychiatry is giving an increased emphasis to the individuality of the problems of old persons with a decreased concern for organic aspects other than attention to nutrition and circulation.

The section on epilepsy in this symposium is almost entirely confined to progress made before 1948, such as the discovery of a thalamic focus for petit mal, the diagnostic use of sleeping electroencephalograms, and the rôle of "agenized" flour in producing "running fits" in dogs. The demands being made from child psychiatry are still in excess of the available trained personnel. Glutamic acid has not wiped out mental deficiency but its limited value has stimulated interest in an uninspiring field. Interest has also been focussed on the importance of acetyl choline in nervous disorders. Shock treatments are still undergoing changes in technique without appreciable progress in the understanding of how they work. There have been extensions in government sponsored mental health clinics, in the family care of mental patients, in the psychiatric education of nurses, in the wider applications of occupational therapy, and in the recognition of the unique contributions of the psychiatric social worker.

There is lack of clarity about the relative contributions to industry from psychiatry and from psychology, and, it appears to this abstractor, that although industrial medical departments are becoming more aware of the psychological factors in industrial illnesses and accidents, there are too few departments of industrial medicine which maintain a satisfactory liaison with their personnel departments and who shoulder their psychological responsibilities in an effective manner. The administration of mental hospitals is receiving a commendable increase of attention, as is the field of forensic psychiatry, while military psychiatry has not been allowed to drop into peace-time limbo. Finally, a great deal of thought is being given to the promotion of psychiatric education, in order to meet the great needs for well trained psychiatrists, and clinical psychologists, and to remedy the deficiencies in the psychological orientation of medical students and of graduate physicians. W. D. ROSS

Industrial Medicine

Human Relations in Industry. Schuster, Sir G.: *Brit. M. J.*, 2: 505, 1948.

The author is of the opinion that the words recently spoken by Sir Stafford Cripps "Co-operation rests on confidence and confidence rests on competence", may be used as a formula for good human relations in industry. That the achievement of such is of great importance is expressed in this article. The author maintains that to make industrial employment an essential part of a satisfactory human life is the greatest need of our modern industrial society. He cautions, however, against human relations being sought merely as a means to improve production. Also, the human factor, or human relations must not be treated as a detached subject for the specialist but rather as a part of a total situation for which all share responsibility. Management must show efficiency.

There is no single universal prescription which will make industrial employment a satisfying creative activity in a satisfactory pattern of society. There must be constant variety and flexibility of method. Immediate attention should be placed on removing obstructive influences. The values of good organizational structure and

of joint consultative methods are stressed. Reference is made to outside influences which may help or obstruct the fulfilment of the purpose. These include that of trade unions, also political influences, influences of home conditions, of education, and of habits. The important problem is how the various people concerned—executive officers, functional officers, rank and file,—play their parts in this field of human relations. Everyone engaged in industry in any capacity should be concerned all the time with everything related to human relations and attitudes.

The author outlines in detail the important position of the industrial medical officer as a member of the management team and offers certain ideas which he would like to see accepted. Several matters which closely concern the medical officers are (1) fitting the man to the job and the job to the man, (2) human understanding of each individual and (3) health. It must be remembered, however, that unless there is confidence based on genuine consideration for the individual worker, medical advice and medical inspection, if seen as part of the "management" set-up are apt to be distrusted and feared. Attention is drawn to the fact that human relations are a two-way business, and the success of anything that can be done depends not merely on how management behaves to workers but on how the individual workers respond. MARGARET H. WILTON

Pulmonary Affections of Occupational Origin. Johnstone, R. T.: *Am. Rev. Tuberc.*, 58: 375, 1948.

That an industrial environment does not induce tuberculosis has been recognized for some time. In 1942, when summarizing opinions expressed at the Symposium on Tuberculosis in Industry, held at the Saranac Laboratory for the Study of Tuberculosis, it was agreed that exposure to fumes and gases could not be proved to favour the onset of tuberculosis; that neither lead absorption and intoxication nor mill dust and foundry employment are associated with the development of tuberculosis. High temperatures and humidity are without significant influence upon tuberculosis. Radiant heat in the steel industry causes no tuberculosis in those exposed.

Frequently chest films of persons exposed to chemicals or dusts are interpreted by inexperienced physicians, as showing pathological findings which are not actually present. Such misinterpretation can have serious effects on the patient. The author of this article discusses the problem and stresses the necessity of accurate reading of the chest films of industrial workers. Diagnosis of pulmonary affections of occupational origin, should not, however, be based upon chest films alone. It is necessary to consider other factors. The complete history of the patient's lifetime employment is important, as are also the chemical properties of the alleged offending agent. The introduction of new chemicals into industrial processes and the recently discovered adverse reaction of the lungs to certain silicates have drawn attention to this. In order to avoid incorrect interpretation, the general practitioner, the radiologist and the "chest specialist" must be cognizant of the pathological and roentgenological effects that can be produced by certain dusts and chemicals. The distinction between benign pneumoconiosis and disabling fibrosis should be clear. Unless an inhaled substance is capable of setting up a proliferative fibrosis, no harm will result.

After discussing briefly a few of the inert or benign dusts as iron dust, cement dust, cotton dust, and fiberglass, the author gives detailed information in connection with the following harmful ones: bauxite, diatomaceous earth, beryllium, and cadmium. In each case the roentgenographic picture is clearly outlined. MARGARET H. WILTON

OBITUARIES

Dr. George W. Argue died recently at Winnipeg, Manitoba, aged 73 years. He graduated in medicine in 1901. Surviving are his widow, one daughter and two brothers.

Dr. Johan Beetz, prominent physician and naturalist, died at his home in Quebec on March 26. He was 74. Dr. Beetz was born in Brussels and came to Canada in 1897. He settled first in a tiny St. Lawrence River North Shore village, near Havre St. Pierre which today bears his name, Baie Johan-Beetz. He became a naturalized Canadian in 1922.

Dr. André Bigué, le premier médecin qui soit allé s'établir en Abitibi et l'un de ceux qui ont contribué le plus au développement de cette grande région du nord-ouest de la province de Québec, est décédé le 17 février à l'Hôtel-Dieu, Montréal, à l'âge de 65 ans. Né en février 1883, à Ste-Anne-de-la-Pérade, il avait fait ses études classiques aux séminaires de Trois-Rivières et de Québec, puis ses études de médecine à l'université Laval de Montréal où il gradua en 1906. Il était allé s'établir en Abitibi au début de 1913. Il laisse, outre son épouse, deux fils, trois filles, et deux frères.

Dr J.-A. Boucher, est décédé le 15 février à sa résidence à Sherbrooke, Que., à l'âge de 62 ans après une maladie de plusieurs mois. Né à Sherbrooke il avait fait ses études chez les RR. FF. du Sacré-Cœur de Sherbrooke-Est, au Séminaire St-Charles Borromée et à l'université Laval de Québec. Admis à la pratique de la médecine, il exerça d'abord sa profession à Windsor Mills pendant une dizaine d'années, puis, il vint s'établir à Sherbrooke. Pendant un certain temps, il exerça les fonctions de coroner dans le district de St-François. Sa femme, un fils, un frère et six sœurs.

Dr Cyrille-B. Delâge est décédé subitement le 7 mars à Thetford-les-Mines, Que. Agé de 67 ans et 8 mois, il pratiquait la médecine en cette ville depuis sa sortie de l'Université. Son épouse, 4 filles, 3 fils et un frère.

Dr. Francis Benjamin Elliott died on March 26, 1949, at his home in Macklin, Sask., at the age of 82 years. He was born on October 15, 1866, in eastern Canada, and graduated from McGill in 1896. He registered in Saskatchewan on April 11, 1912, residing since then in the Macklin district. About 230 guests attended a banquet held in his honour on the occasion of his 81st birthday and in recognition of his services to the community. He is survived by his widow, Mary C. McLean, and family, among whom are Alexander Elliott, and Dr. Francis Elliott of Edmonton.

Dr. William David Ferguson, died on February 15 at his home in Hamilton, aged 62 years. Born in Valetta, Kent County, he graduated from Toronto University in 1908. He spent five years in medical work in China and went to Hamilton in 1917. He was a member of Melrose United Church and of St. John's Masonic Lodge. He was a member of Murton Lodge of Perfection, Hamilton Sovereign Chapter of Rose Croix. Surviving are his widow; two sons, one daughter, three brothers and two sisters.

Dr. John Harold Hershey, aged 51, died suddenly, recently, in Portland, Oregon. Born at Owen Sound, Ont., he attended public school and the Collegiate Institute here. He interrupted his education to serve overseas with the Royal Canadian Artillery in the First World War, and after being demobilized took his surgeon's degree at Queen's University. Dr. Hershey practised for some years at Roseneath, Ont., before moving to the United States. He is survived by his widow, two daughters, one sister and two brothers.

Dr. D. M. G. DuVernet Jack died at his home in Woodman's Point, N.B., January 12, 1949, aged 85. He graduated from McGill University in 1892, and practised in Grand Manan and later at Glenwood on the Saint John River. Dr. Jack had retired from practice several years ago.

Dr. Archibald D. McAlpine, aged 67, Detroit Police and Fire Department surgeon, died February 27, at his home in Detroit. Born in Glencoe, Ont., he attended Toronto University and graduated from the Detroit College of Medicine in 1905. Surviving are his widow and a daughter.

Dr. F. G. MacAskill, aged 64, died at his home in Glace Bay, N.S., on March 15. He had been ill since October. A native of St. Peter's, N.S., he graduated from Dalhousie Medical School in 1911. His first practice was at St. Peter's. In 1915 he went overseas with the Canadian Army Medical Corps and on his return set up practice in this mining town. He is survived by his widow, a daughter, a son, five brothers and one sister.

Dr. J. A. MacKenzie, aged 56, formerly of Carman and Winnipeg, died recently in Milwaukee, Wisconsin. Born in Carman, he received his education in Manitoba, graduating from Winnipeg Medical College in 1916. He served overseas during the First World War and remained in the British Isles after the war to receive degrees at London and Edinburgh. For the past 20 years he has practised at Milwaukee. He was a 32nd degree Mason and a Shriner. Surviving are his widow, two sisters and a brother.

Dr. Charles Ogilvy died on February 18 at his home in New Rochelle. He was 74 years old. Born in Montreal, he was a graduate of McGill University and completed his medical education in Vienna and Berlin. Dr. Ogilvy was an honorary member of the New Brunswick Medical Society of Canada, and Fellow of the American College of Surgeons. Surviving are his widow, three sons and a sister.

Dr. Carlyle Arnot Porteous of Montreal died on March 14. He was in his 73rd year. Dr. Porteous was born in Iroquois, Ont., and was educated at the Kingston Collegiate and Queen's University. He graduated from the latter in medicine. Following graduation, Dr. Porteous joined the staff of the Verdun Protestant Hospital. A year later he travelled to Burma and up the Amazon river as a ship's surgeon. He later took a post-graduate course at the Royal Infirmary in Edinburgh, Scotland. On returning to Canada in 1904 he rejoined the staff of the Verdun Protestant Hospital and was appointed assistant medical superintendent. He was appointed medical superintendent in 1923, a position he held until his retirement in 1947. For many years he was professor of clinical psychiatry at McGill University, a position he relinquished in 1942. Dr. Porteous was a noted lecturer and writer on medical affairs. He also was an assistant in neurology at the Montreal General Hospital and was a member of the board of the National Committee for Mental Hygiene in Montreal. He is survived by his widow, a son, a daughter, a brother, a sister and three grandchildren.

Dr. James Adam Proudfoot, aged 73, died on March 3 at Inverness, N.S., after an illness of four weeks. Born in Salt Springs, Pictou County, N.S., he was a former mayor of Inverness and sat in the Nova Scotia legislature as a Liberal member from 1928 until 1933. Besides being coroner he also was county health officer at the time of his death. He graduated from Dalhousie medical school, Halifax, in 1905 after completing his high school education at Pictou Academy. He practised in River Hebert for a time before coming to Inverness where he resided for the past 40 years. He enlisted with the Royal Medical Corps during the first world war and served in Egypt and Cairo and on the staff of Camp Hill

Hospital in Halifax. His work during the 1917 Halifax explosion gained widespread recognition. Besides his widow he is survived by two daughters, a son, a brother and a sister.

Dr. W. Donald Rankin died in South Porcupine, Ont., on March 15. He opened his practice in the Spring of 1936 and continued it until early in the Second World War. He then enlisted in the R.C.A.M.C. and was later attached to the Royal Canadian Air Force as a medical officer, going overseas with the first fighter squadron. Following his discharge from the services he went to South Porcupine and had only recently been appointed Chief Medical Officer for Hollinger Mines. During the days of the Moose River mine rescues, Dr. Rankin was one of the party of Halifax medical men who went to the scene of the disaster to render any aid that they could give when the entombed men were liberated. A native of Woodstock, New Brunswick, where his father had also been a medical practitioner, Donald Rankin studied at McGill medical school. He later served at Bellevue Hospital in New York and also engaged in private practice in that city for six years before coming to Halifax. He is survived by his widow and one son.

Dr. Albert Arthur Schaffner died at his home in Halifax on April 1, at the age of 82. Born in Williams- ton, Annapolis County, he graduated in 1894 from the College of Physicians and Surgeons of Baltimore and practised for upwards of fifty years in Halifax until his retirement three years ago. During the first war he held the rank of Lieutenant Colonel in the R.C.A.M.C. and for a time was in charge of Cogswell Street Military Hospital, Halifax. For several years after the war he was a City Alderman.

Dr. Henry Beaumont Small, the oldest graduate of McGill University, died at his Ottawa home on February 19. He was born in Toronto on April 17, 1854. Dr. Small had been practising medicine in Ottawa since his graduation from McGill in 1880. His notebooks containing lectures on physiology by William Osler are in the Osler Library at McGill University. He began his practice when Ottawa was a lusty lumbering town, and his first patients were the injured mill workers that came to his office. Dr. Small may properly be called one of Ottawa's pioneer doctors. He was a member of the first Board of Health, when there were only 17 doctors in Ottawa. He was one of the first physicians here to use ether, and the first to use an automobile in making his rounds. Honoured often by members of his own profession he was made an emeritus member of the McGill Graduates' Society in 1946, and an honorary life member in 1947. In 1930 he was presented with the traditional gold-ornamented cane by the Medico-Chirurgical Society, marking his 50th anniversary of practice in Ottawa. He was an honorary life member of the society. Among the other professional groups in which he was active was the Canadian Medical Association, of which he was treasurer for 25 years. As interested in outdoor life as he was in his profession and civic affairs, he was a charter member of the Royal Ottawa Golf Club, and a member of the Rideau Curling Club and the Ottawa Field Naturalists Club. He was a member of the Anglican Church, attending St. George's in recent years. He was a member at one time of the original Christ Church. He is survived by one son, two daughters, a brother and a sister.

Dr. C. A. Staples, aged 79, died suddenly on March 10 at Stettler, Alta. He had been chairman of the Stettler School Board for several terms and town medical officer many years. He also was president of Alberta School Trustees Association for 20 years. Born in Collingwood, Ont., Dr. Staples was a graduate of McGill University and practised in Montreal for a short time before coming to Stettler in 1905. He served in the medical corps in the First Great War. Surviving are his widow, a son and a daughter.

Dr. Elizabeth Steele died at her home in Winnipeg on March 17 after a long illness. In the first world war she served overseas as a nurse, then graduated in medicine from the University of Manitoba in 1935. She practised in paediatrics in Winnipeg. Her husband and son survive her.

Dr. David Alexander Whitton died on March 17 at his home in Ottawa. He was 76 years old. Born in Ottawa in 1873, he received his education in local schools and was a graduate of Lisgar Collegiate. He graduated in medicine from McGill University in 1898. He worked his way through medical school by working as a conductor with the O.E.R. While in college, he was a great sports enthusiast, particularly football. Dr. Whitton was captain of his class team and was a member of the intermediate football team which won the Quebec championship in 1896. He was serving as house surgeon at the Protestant General Hospital when hostilities broke out in South Africa. He joined the Canadian Field Artillery as a hospital corporal. He served for one year with this unit, then joined the British forces and attained the rank of captain. His colorful career continued when he became ship surgeon on C.P.R. ships and also for one trip to the West Coast of Africa he was surgeon for the Elder Dempster Company. Furthering his medical studies, he went to England and Scotland and graduated as a licentiate of the Royal College of Physicians and Surgeons of Edinburgh. He practised medicine for a time and then enlisted as a medical officer with the rank of major with the 3rd Canadian Division Ammunition Column in France where he remained until 1917. Following the war he became attached to the Kitchener hospital in Brighton, England.

He was later appointed as officer commanding with the rank of Lieut.-Col. of His Majesty's hospital ship *Araguaya*. During the last five months of the war he was president of the Standing Medical Board in Ottawa. He received many decorations including the Order of the British Empire, St. John of Jerusalem, King and Queen's South African medal, Service medal and the Victory medal. He was a member and trustee of Glebe United Church, was interested in golf, curling, lawn bowling and other sports. He was a member of 35 years' standing of the Aberford Sporting Club. He is survived by his widow and two sons.

NEWS ITEMS

Alberta

A good representation from Alberta attended the American College of Physicians convention in New York city, among those present were: Dr. John Scott, Dr. Gordon Bell, Dr. Kenneth Hamilton and Dr. E. P. Searlett.

The American College of Surgeons is holding a Sessional meeting in Edmonton, April 12 and 13.

Dr. Colin A. Ross of Bellevue attended the American Association of Thoracic Surgery convention in New Orleans, March 29 to 31.

A number of doctors in Alberta have had the good—or bad—fortune to have oil found on their farm property and it reminds one of the sliding and questionable state of Wall Street in 1929.

Golf is rapidly increasing on the various fairways in the larger centres and there is some encouragement at the "nineteenth hole".

The University of Alberta is holding its largest convocation class this year with a goodly number of veterans

in the graduating class. The medical graduating class should be around the fifty mark depending upon the efforts of these fine ladies and gentlemen.

W. CARLETON WHITESIDE

British Columbia

At long last the University of British Columbia is to have its Medical Faculty. It was announced by the President of the University, Dr. N. A. M. MacKenzie, that the first class will enter in the fall of 1950. The first Dean of the new School will be Dr. Myron M. Weaver, M.D., M.S., Ph.D., assistant dean of medical sciences at the University of Minnesota. He is a distinguished figure in American medicine, is an Associate of the American College of Physicians, and diplomate of the American Board of Internal Medicine. He will assume his new position in July of this year. New buildings, to house the departments of anatomy, physiology, bacteriology, pathology, etc., are to be erected forthwith. It had been hoped that the Medical School would have its own University Hospital, but the cost of erecting this, at least at present, is prohibitive. In the meantime, the clinical facilities of the Vancouver hospitals will be utilized.

The recent death of Dr. E. J. Lyon, of Prince George, constitutes a distinct loss to the medical profession of the Province—he will be sadly missed, too, by his many friends, medical and otherwise. Dr. Lyon was a member of the Council of the College of Physicians and Surgeons at the time of his death—and he has been a prominent member of the B.C. Medical Association, in the work of which he was constantly active. His wise counsel and loyalty were greatly valued, and he will not easily be replaced.

The Minister of Health and Welfare of British Columbia, the Hon. George S. Pearson, has announced the Government's program for the control of arthritis and rheumatic diseases. This will eventually cover the whole Province. At the outset special hospital beds, mobile units, etc., will be provided.

The Canadian Arthritis and Rheumatism Society, the B.C. Medical Association, and the Chartered Physiotherapists' Association will be in support of the program. Pilot diagnostic and treatment centres will be established; and physical therapy units will give treatment in homes. Some 45,000 sufferers are involved in the scheme.

The B.C. Surgical Society is holding its annual meeting at Vancouver on April 28 and 29. All medical men are invited to attend the meetings. An excellent program has been drawn up, and the guest speaker will be Dr. O. T. Clagett, of the Mayo Clinic.

The Federal Government has allocated \$247,000 to assist in meeting the building costs of six new or enlarged hospitals in the smaller centres of population in B.C. Alert Bay, New Westminster, North Vancouver, Fernie, Princeton and Murrayville are the areas affected.

Sex education in schools through motion-pictures is being submitted for study and approval to B.C. parents by the Department of Education in Victoria. This system has been in use in schools in Oregon, and is proving satisfactory there. Parents will be asked to fill in questionnaires submitted to them. There are three grades of pictures, the first being used in Grade VI; the second is shown to Grade VII pupils, and the last, dealing with human reproduction, is designed for Grade XI students, and is "perfectly frank, without being objectionable".

A Province-wide campaign to combat livestock diseases is now on. Undulant fever, arising from brucellosis, is the especial object of attack. Certain areas are chosen as control areas, and it is expected that not

only will a large amount of disease be removed, but the financial loss caused by its presence will be greatly lessened, if not completely stopped.

For the fifth time a Vancouver Nursing Division of the St. John Ambulance has been awarded the Dent Rose Bowl in Ottawa. This is the "Oscar" of Canadian St. John Ambulance Nursing. It is a challenge bowl, and is competed for by teams from all parts of Canada.

The first graduating class of the Faculty of Pharmacy of the University of British Columbia held their graduating ceremonies at a banquet at the Hotel Vancouver on March 25. Some fifty candidates were successful in obtaining their diplomas. The guest speaker at the banquet was Dr. G. F. Amyot, Provincial Medical Health Officer, and Deputy Minister of Health of the Province.

J. H. MACDERMOT

Manitoba

Dr. A. Hollenberg of Winnipeg and his wife have returned recently from a twelve weeks' trip to New Zealand. While there Dr. Hollenberg investigated the working of the medical service under the Labour government.

Dr. P. A. Macdonald, director of the Cancer Relief and Research Institute, had a surprise March 14 when he appeared as speaker at a luncheon meeting held by the Women's Club of Winnipeg at the T. Eaton Assembly hall. He was welcomed by the president, Mrs. E. P. Thompson, who presented him with a cheque on behalf of the Club, for \$400.00 to further the work of the Institute.

Dr. Joseph Doupe has been appointed Professor of Physiology in the Faculty of Medicine, University of Manitoba. He will continue as head of the Research Department.

A Royal Commission, headed by Chief Justice Ewan McPherson, has tabled a report to the provincial legislature. The report recommends that the per diem grant for public ward patients be increased from \$2.50 to \$4.00 and that special consideration be given to teaching and research hospitals, also the hospitals which conduct outpatient departments. It also recommends a proper system of cost accounting in the hospitals of the province.

It is reported that the Sisters of St. Boniface Hospital (Grey Nuns) are considering having the old north wing of the hospital torn down and replaced by a modern structure.

ROSS MITCHELL

New Brunswick

Dr. F. B. Wishart has been appointed clinician at the Cancer Diagnostic Clinic at the Fisher Memorial Hospital at Woodstock. Hon. Dr. F. A. McGrand announced that this clinic will open in April. This is the eighth sub clinic to be opened in New Brunswick in the past year.

Dr. Louis Phaneuf of Boston, Mass., was the guest speaker at the monthly meeting of the St. John Medical Society. His topic "The lacerations and displacements of the Female Pelvic Organs". Dr. Geo. White president of the society was chairman and the guest speaker was introduced by Dr. Alice M. Brown.

Dr. Storey Hynes who has been radiologist at the Fredericton General Hospital for some years has severed his connection with that hospital and is going west to a new appointment.

Dr. Norman Skinner of Saint John is attending the meetings of the American College of Physicians in New York. Following the meeting Dr. Skinner intends doing special studies in hæmatology.

Dr. A. H. Gordon of Montreal paid a fleeting visit to Saint John recently for a consultation on a seriously ill medical friend. Dr. H. A. Farris and W. O. MacDonald are attending the meeting of the American College of Physicians. A. STANLEY KIRKLAND

Ontario

Dr. R. G. Bell, medical director of Shadow Brook Health Foundation at Willowdale, a Toronto suburb addressed the American Association of Industrial Physicians and Surgeons at Detroit on the clinical trial of antabuse in the treatment of alcoholism, he said that patients who could not be helped by Alcoholics Anonymous or any other method appear to be remaining sober in a way they never have before. He deplored the fact that Canada permits the sale of antabuse through a doctor's prescription. Clinical tests will have to be continued for many more months before the drug can be safely released even by prescription. He said that it is extremely dangerous to give antabuse to any person under the influence of alcohol. The patient should be in an institution where oxygen is available. No antidote has yet been discovered.

Dr. Malcolm Cameron addressing the Julia Green-shields Memorial Home annual meeting said that medicine and the public have discovered that the study and treatment of old age is as important and interesting as that of youth. Understanding and sympathy are essential in the study and administration of geriatrics.

The annual banquet of the Medical Alumnae Association in honour of the thirty-two women in the graduating class in Medicine was held at the Granite Club, Toronto, Miss H. Millichamp spoke on "Trends in British Education".

The Junior League of Toronto has sponsored a clinic for the young Toronto victims of cerebral palsy. At this clinic, which operates daily at the Carleton Street United Church, children of preschool age are to be educated mentally and physically in the hope of preparing them for regular schooling. A physiotherapist and an occupational therapist working there took training in Buffalo under Miss Paula Egle, pupil of Dr. Winthrop Phelps. Medical care for the ten or twelve patients selected for clinic treatment will be under the medical and neurological staffs of the Hospital for Sick Children and surgical care under the surgical and orthopaedic departments of the same hospital.

These spastic cases will receive treatment through massage, remedial exercises, special splinting and bracing, physiotherapy, occupational therapy and speech therapy and general nursery school training. The clinic will operate on a day basis and will be open only to children of the Toronto district. But it is not expected that it will be able to care for all those who apply. It is the hope of doctors associated with the project that those not taken on for regular attendance may be seen periodically by the staff when their parents can be given instruction on home care.

The Women's College Hospital admitted 5,749 patients in 1948. The average stay was 7.7 days. Total revenue was \$506,167, expenses were \$516,815 making a deficit of \$10,648. The Cancer Detection Clinic, opened in May has examined 429 patients and has a waiting list of 1,700 women.

Dr. G. W. W. Mylks, Sr. of Kingston addressed a recent meeting of the Kingston and Frontenac Medical Society on reminiscences from fifty years of practice,

he told of the horse and buggy days and of the early pre- and post-operative surgical preparation of patients. The patient fasted for twenty-four hours before the operation and was given a brisk laxative the night before, little attention was paid to the fluid balance and the patient often came to the operating table somewhat dehydrated. After the operation came another period of starvation, a laxative was often given the second day with an enema on the following morning. Dr. Mylks paid tribute to the following members of the staff of Queen's: Dean Fife Fowler, Honourable Michael Sullivan, Dr. Herbert Saunders, Dr. Kenneth Fenwick and Dr. J. C. Connell.

In the year 1948 the Ontario Department of Health spent \$30.6 millions. All of the province's 175 general hospitals are participating in the province's maintenance grants and 3,763 beds have been authorized and qualified for the capital grants.

Under the Chiropody Act the following members were re-appointed members of the Board of Regents: Dr. J. Harold Couch and Mr. Martin Cole of Toronto.

Dr. David Aylmer Scott, Research Member of the Connaught Laboratories at the University of Toronto was elected one of the twenty-five new fellows elected at a meeting of the Royal Society of London. Dr. Scott is distinguished for contributions to the chemistry of insulin, heparin and carbonic anhydrase.

George O. Watts, B.A., M.D., F.R.C.P.[C.] has announced the opening of an office for the practice of Neurology and Psychiatry in the Medical Arts Building, Toronto.

Twenty-four units of the Canadian Cancer Society operate in the larger centres across Ontario. In the province \$500,000 is needed. The funds will be used for research, extension of diagnostic and treatment facilities, educational work and service to cancer patients.

Dr. William Ogden of Toronto is at Trinity College, Cambridge as a guest of the British Tuberculosis Association where he is addressing the Society. Before returning he will visit hospitals in Britain and France.

Dr. C. B. Farrar and Dr. J. Nathan McKinley have been elected Life Fellows of the Toronto Academy of Medicine. Dr. William Boyd has been elected a Benefactor.

Dr. R. B. Robson of Windsor believes that industry has a responsibility to the older age group of employees regarding their education. Last year he attended a course in adult education at Ann Arbor, Michigan and in turn carried out a course for a group of fifty workers over the age of fifty. Dr. Robson reported this experiment at the annual meeting of the Industrial Physicians and Surgeons at Detroit.

Dr. Neil McDonald and Dr. C. Sanborn of Windsor and Dr. Robert Laird of Toronto attended the meeting of Thoracic Surgeons at New Orleans.

LILLIAN A. CHASE

Dr. John Coleman Laidlaw, 188 Montclair Ave., Toronto, was awarded a research fellowship by the American College of Physicians at the annual convocation in New York, March 30, 1949. Dr. Laidlaw was formerly a medical officer in the Royal Canadian Navy. He is at present a lecturer in Biochemistry at University College, London, England.

Dr. J. A. A. Harcourt, of Toronto, has been appointed Medical Referee of the Toronto Mutual Life Insurance Company.

The Federal Government has approved grants to five Ontario hospitals in Peterborough, Oshawa, Cornwall, Oakville and Dunnville. This will add a total of 276 beds. The Oakville-Trafalgar Memorial Hospital is a new institution with a bed capacity of 50 beds. The Haldimand War Memorial Hospital in Dunnville will replace an old hospital and will have a bed capacity of 53 beds.

A form of group insurance for members of the Toronto Academy of Medicine has been completed and the policies are now in force.

The establishment of a Maternal Death Survey Committee for the City of Toronto has been proposed. It is hoped to reduce maternal mortality. The scheme may later be spread throughout the Province of Ontario.

The Section of General Practice of the Ontario Medical Association is arranging a series of postgraduate courses. The first was an intensive course in Practical Surgery and was held at Sunnybrook Hospital on March 28, 29 and 30, 1949.

Dr. H. L. Bower has opened a practice at Atwood, Ontario.

Dr. A. C. Singleton has been elected president of the Canadian Association of Radiologists.

Dr. Bruce Hopkins of Kingston, Ont., has been made president of the Canadian Tuberculosis Association.

NOBLE SHARPE

Quebec

La section québécoise de l'Association Médicale Canadienne a tenu à Montréal, les 22 et 23 avril, sa réunion annuelle à laquelle elle avait invité tous les médecins de la Province. Au dîner du samedi 22 avril, le Docteur Paul Dumas a parlé de *La Médecine et l'Amour*. Les orateurs aux déjeuners furent Mgr Olivier Maurault, M. C.-F. James, Son Honneur M. Camillien Houde, Maire de Montréal, et le Docteur Victor Johnston, président de l'Ontario Medical Association.

Le Gouvernement fédéral projette la construction, sur le terrain de l'Université Laval, d'un hôpital pour les anciens combattants. Cet établissement contiendra de 250 à 350 lits et servira à l'enseignement universitaire. On construira aussi une maison pour les infirmières.

La Cité universitaire de Québec sera aussi pourvue, dès l'année prochaine, d'un Centre médico-pédagogique pour les enfants sous-doués. La nouvelle institution contiendra 800 lits; elle sera érigée avec la collaboration du Ministère provincial de la Santé.

Le nouveau Bureau médical de l'Hôpital Notre-Dame de Montréal se compose de MM. Georges Hébert, président, J.-P.-M. Ricard, vice-président, E. Autotte, secrétaire, Georges Leclerc, Emile Ménard, J.-A. Rouleau, Paul Bourgeois et Charles Hébert.

M. Gérard Rolland, chirurgien de l'Hôpital du Sacré-Cœur de Cartierville, présidera cette année la Société de Phtisiologie.

Le Professeur Emile Legrand devient secrétaire de la Faculté de Médecine de Montréal. Il remplace le Professeur Jean Delage démissionnaire.

L'Université Laval vient de créer un Département de psychiatrie. Le bureau de direction de ce nouveau département est présidé par le Docteur Gustave Desroches, directeur de l'Hôpital Saint-Michel-Archange, et comprend également MM. Jean-Charles Miller, Sylvio Caron et Charles-Auguste Gauthier.

Le Docteur Henri-R. de Saint-Victor, de Québec, sera chargé d'un cours à l'Université d'Ottawa.

Dr. R. R. Fitzgerald has been appointed Professor of Surgery at McGill University and Surgeon-in-chief at the Montréal General Hospital. In the latter post he succeeds to Dr. Fraser Gurd who died recently.

Le Service de transfusion sanguine de la Croix rouge canadienne fonctionne à Montréal depuis la fin de février. Déjà, trois des principaux hôpitaux montréalais s'y sont inscrits. Outre de fournir gratuitement le sang et le plasma sanguin, ce service se chargera de faire la détermination des divers génotypes Rh, de donner des consultations sur tout ce qui regarde les transfusions sanguines et de former infirmières et techniciennes spécialisées en ce domaine. Le docteur Ronald L. Denton est le directeur médical provincial de la Croix-Rouge; il est assisté du docteur Thérèse Rousseau.

Dr. Richard M. H. Power of Montréal has received the degree of Doctor of Science from Laval University. He has been engaged in research under the direction of Dr. C. P. Martin of McGill.

Boursière du Gouvernement provincial, le docteur Thérèse Levac, de Montréal, ira en France se perfectionner en médecine interne et en hématologie.

Réunie en séance régulière sous la présidence de M. Paul Letondal, l'Association des Médecins de l'Est de Montréal a recommandé au Collège des médecins et chirurgiens l'établissement d'un cours de perfectionnement destiné aux praticiens.

Le docteur Alexandre Sirois, diplômé de Laval, a été élu directeur de l'Hôpital Saint-Joseph de Thetford-Mines.

PAUL DE BELLEFEUILLE

Saskatchewan

The cancer clinic at the Grey Nuns' Hospital in Regina will be known as the "Allan Blair Memorial Clinic" in memory of the late Dr. Allan Walker Blair. Prior to his death on November 9, 1948, Dr. Blair was Director of Cancer Services for the Saskatchewan Cancer Commission. In making the announcement Premier Douglas said, "Dr. Blair performed outstanding services in the advancement of the control of cancer, not only in Saskatchewan but also throughout Canada. It is therefore deemed desirable to perpetuate his memory by designating the cancer clinic as the 'Allan Blair Memorial Clinic'".

G. G. FERGUSON

General

Mrs. Eileen R. Cunningham, Librarian of Vanderbilt University School of Medicine has been chosen as first recipient of the Medical Library Association's Marcia C. Noyes Award. This award, named after one of the Association's charter members and its first woman president, was conferred upon Mrs. Cunningham in recognition of her outstanding achievements in medical librarianship.

March of Books, the campaign to collect from Canadians, books and other publications of educational value for distribution to war-devastated libraries, will soon conclude active operations. If individual members or groups of our association missed contributing during the general appeal, or have further contributions, it has been arranged that freight charges will be paid on books shipped collect to the Canadian Book Centre, Halifax, before June 15, 1949.

Groups shipping books should bear in mind that freight charges are based on a minimum of 100 pounds,

and that the rate for any shipment less than 100 pounds is the same as the rate for 100 pounds. In the interest of economy, donations should be bulked for shipment wherever possible. Books should be packed in cartons, securely fastened with steel straps or rope, and shipped freight collect to the Canadian Book Centre, Terminal Road, Halifax, N.S.

Standard works and classics in all subjects are needed. Books of permanent value, in the original language or translation should be sent. Books published during and after 1935 are especially wanted, and need for recent publications in science and technology has been emphasized. Journals and periodicals in every academic field are valuable. The gap in knowledge caused by the war is particularly apparent in numbers since 1935, although complete sets or runs of earlier issues are of definite value. Do not send popular magazines, or other light material which is of no value to students.

Contributions to March of Books will be of practical significance in post-war reconstruction and a fine gesture of international friendliness for Canada. Enquiries about March of Books should be directed to Mrs. Margaret Reynolds, Director, Canadian Book Centre, Terminal Road, Halifax, N.S.

International Congress on Rheumatic Diseases. The current interest in arthritis and the other rheumatic diseases will receive additional impetus when several hundred physicians from the United States and foreign countries gather at the Waldorf Astoria in New York for the seventh International Congress on Rheumatic Diseases from May 30 to June 3. This Congress is sponsored and supported by several organizations including the American Rheumatism Association, the United States Public Health Service, and the Arthritis and Rheumatism Foundation, the latter being established only in 1948. Following the closing of the Congress, most of the participants will go to Atlantic City for the annual session of the American Medical Association, which will have several scientific exhibits on the rheumatic diseases and several papers before various Sections. A post-convention tour will cover the sixteen days following the session of the American Medical Association. Philadelphia, Boston, Buffalo, Detroit, Chicago, Rochester (Minnesota), and Washington, D.C. will be the cities visited. Scientific sessions will be held at Philadelphia, Boston, and Rochester. Sight-seeing using motor coaches will be included in the itinerary for those visiting Boston, Washington, Niagara Falls, and Chicago. Inquiries concerning registration, the complete program, and other aspects of the Congress can be addressed to Mr. Robert D. Potter, Executive Director, 535 Fifth Avenue, New York, New York.

Sixth International Congress of Radiology. The Sixth International Congress of Radiology will be held in London July 23 to July 29, 1950. The headquarters of the Congress will be at the Central Hall, Westminster, which will also house an extensive Scientific Exhibition. The Technical Exhibition of apparatus will be located in the Halls of the Royal Horticultural Society nearby.

A varied and interesting social program is being arranged for members of the Congress, and special attention is being paid to the entertainment of Associates accompanying Members.

During the week preceding and the two weeks following the Congress demonstrations will take place in the radiological departments of a number of London hospitals. Planned tours to centres of interest in Great Britain and Ireland are being arranged to follow the Congress; they will include excursions to the neighbouring countryside by coach, visits to buildings of historical interest, demonstrations at hospitals, and a full social program. Those wishing to attend the Congress as Full Members (£7. 7s. 0d.) or as Junior Members (under 30 years of age on January 1, 1950—£4. 4s. 0d.) must be members of a radiological society, or sponsored by a radiological society. Ladies and children accompanying Members can be registered as Associate Members

(£3. 3s. 0d.). Associate Membership is also open to technical staff of radiological departments and laboratories, or of the x-ray industry. A late fee will be charged to those registering after April 1, 1950.

Members of the Congress may make their travel and hotel reservations through any office of Messrs. Thos. Cook & Son, Ltd. (or their associated company, the Cie Internationale des Wagons-Lits) who have been appointed the official travel agents for the Congress.

Royal Society of Edinburgh. A David Anderson-Berry silver-gilt medal, together with a sum of money amounting to about £100, will be awarded in 1950 by the Royal Society of Edinburgh to the person, who, in the opinion of the Council, has recently produced the best work on the therapeutical effect of x-rays on human diseases. Applications for this prize are invited. They may be based on both published and unpublished work and should be accompanied by copies of relevant papers. Applications must be in the hands of the General Secretary, Royal Society of Edinburgh, 22 George Street, Edinburgh, 2, by March 31, 1950.

Soon after the war ended arrangements were made to prepare in review form an account of the investigations and advances of a fundamental scientific nature made by German scientists in the various fields of science during the period May, 1939 to May, 1946. These reviews were prepared by German scientists under the direction of the joint organization known as Field Information Agency, Technical (FIAT). Owing to the disorganization of Germany the task was extremely difficult, but these reviews are now complete. In the case of Medicine there are 15 reviews published in 26 volumes. They are in German, as there has been no means of translating them, and are available for all Canadian University libraries. Distribution in Canada is being carried out by the Canadian Research Council.

These volumes should fill an important gap in the recorded research done in Germany throughout the war years.

BOOK REVIEWS

British Surgical Practice. Vol. 3. Under the General Editorship of Sir Ernest Rock Carling, Consulting Surgeon, Westminster Hospital; and J. P. Ross, Surgeon and Director of Surgical Clinical Unit, St. Bartholomew's Hospital. 561 pp., illust. Butterworth & Company (Publishers), Ltd., London and Toronto, 1948.

This volume begins with Cæsarean section, which outlines the historical interest of this old operation, and compares the results of the lower segment with the classical operation, the former having a much lower mortality rate, especially after manipulations. Mr. Donald describes Cellulitis and Erysipelas well, in a short space; while Lambert Rogers clarifies Cervical Rib and the Scalenus Syndrome. There is an interesting article on the Surgical Aspects of Chemical Warfare, which is as complete as is necessary. The vesicant gases including lewisite and mustard gas, are described, finally there is a short description of phosphorus burns. The article on Chemotherapy by definition is confined to the Sulphonamides. One must again state that the increase in our knowledge of the antibiotics must not be left without mention, when the 8 volumes are completed. The specialties within surgery now begin to make their appearance. Plastic Surgery is described in considerable detail in an article on Cicatrices. Mr. Levi is concise and authoritative on Circumcision. The description of coagulants and anti-coagulants is slightly disappointing, because the practical application of this knowledge has not been outlined. Gelfoam, Oxycel and the Alginates are missing. In fact, a great deal of the recent work on this

subject, particularly in the American literature, is omitted. It is refreshing to read the straightforward article on Compensation, Damages and Pension. This contains much excellent advice and should be read by everyone doing compensation cases. It ends with two cardinal rules, "Give the simple truth in simple English", and "Be heard by everyone in court". This volume, in spite of the few criticisms mentioned, is well up to the standard of the other two. The advantages of this method of indexing becomes increasingly apparent as one uses the volumes; while the clear type and spacing, with short presentation of each subject, makes this work extremely valuable for reference.

Cardiography. W. Evans, Physician to the Cardiac Department of the London Hospital. 149 pp., illust. \$7.50. Butterworth & Company (Publishers) Ltd., London and Toronto, 1948.

This volume deals with clinical electrocardiography and phonocardiography. It is designed to replace the author's book entitled "A Student's Handbook of Clinical Electrocardiography" which went out of print during the second World War. The purpose of the present book is to aid a physician preparing for a higher examination or to guide medical practitioners in the understanding of electrocardiographic and phonocardiographic interpretations made upon their patients. These aims are well fulfilled. In the introductory sections there is a consideration of the physiological variations in the electrocardiogram, and a study of the disturbances in rhythm. Then follow brief sections regarding the electrocardiographic changes characteristic of various cardiac lesions. The comments are brief and to the point, and the changes shown by the illustrative tracings are the typical variety. There is a section of "Test Electrocardiograms", which may be interpreted by the reader and compared with the author's interpretation. The second part of the book deals with the clinical use of phonocardiography. The author has made an assessment of the aid which this method of recording may provide. The section is well arranged, and in compact form, provides good graphic records of heart sounds, together with their interpretation and relationship to the associated clinical condition.

Cardiology. Wm. Evans, Physician to Cardiac Department, London Hospital. 310 pp., illust. \$10.50. Butterworth & Co. (Publishers) Ltd., London and Toronto; Paul B. Hoeber, Inc., New York and London, 1948.

A beautifully written text on some aspects of heart disease. As pointed out by the author in the preface it is meant as a more concise treatise for students seeking qualifying or higher examination. The title of this book might more accurately have been "Some Aspects of Cardiology" since it makes no attempt to cover the whole subject. Electrocardiography for example is dealt with in a few pages, though there are many electrocardiograms used throughout as illustrations. A student wanting to learn something of the interpretation of tracings would of necessity have to consult other texts. The discussion of heart murmurs on the other hand is excellent and reveals the author as typical of the best tradition in English clinical medicine. It is to be regretted that such an excellent text should be marred by some figures and tables that not only serve no useful purpose but actually detract from the merit of the book. Table XIII on page 244 for example tabulates the heart rate in 18 patients with auricular fibrillation after treatment with various drugs. The age, sex and weight of the patient are given, the number of doses daily, and then the heart rate under the heading of eleven drugs. There is nothing to indicate the rate before treatment, or how many days the treatment was given. While most of the drugs are of the digitalis group coramine is for some reason included in this series. One is forced to

the conclusion that the author felt that some tables were necessary and therefore tables were prepared regardless of their value. The discussion of hypertension seems inadequate when compared with the views rather generally held on this Continent. While surgical treatment has not been universally accepted it probably merits more consideration than given on page 215. Evaluation of any treatment of high blood pressure must rest on more than the changes in level of the systolic pressure. There is much in this text that is stated as fact or implied by inference with which many might justifiably differ, but it has merit as a lucid exposition of an excellent clinician's views on the bedside aspects of some phases of heart disease.

Modern Trends in Psychological Medicine 1948.

Edited by N. G. Harris, Physician for Psychological Medicine, Middlesex Hospital. 450 pp., illust. \$15.00. Butterworth & Co. (Publishers), Ltd., London and Toronto, 1948.

The editor planned with this book to do more than outline the more recent developments in psychiatric investigation and treatment. He has succeeded in presenting a very broad and comprehensive outline of the background, developments, scope and present limitations in the field of modern psychological medicine. The causative factors in mental disturbances are covered fully, from the consideration of physiological mechanisms in the emotions, the biochemical and other physical factors, to the present attitude towards and the importance of childhood development, marriage and the family. Chapters are devoted to electrophysiology and to the psychopathic personality. The discussion of treatment includes an outline of the general methods in psychotherapy, the advances in, and results in the various types of physical therapy, and the types of social and group therapy. Further chapters discuss the developments in personnel selection in the services and in industry. The rôle of psychological medicine in industry and in the rehabilitation of the disabled is outlined. Some of the sections are necessarily brief, but the editor's purpose, "to provide a visionary layout" has been accomplished and he has edited a book which should prove stimulating to psychiatrists as well as to other members of the profession. Psychologists and social workers will find it of interest.

Textbook of Gynaecology. E. Novak, Assistant Professor of Gynaecology, The Johns Hopkins Medical School. 742 pp., illust., 3rd ed. \$8.00. The Williams & Wilkins Co., Baltimore, 1948.

One can expect three things of Emil Novak's writings; (1) that the pathological background will be outstanding; (2) that the important endocrinological sections will be expertly handled; and (3) that a sane course will be taken amid conflicting views. These three characteristics appear everywhere throughout this new edition of his excellent textbook. The thoroughness of the pathology fills that great gap left in our literature by the passing of Eden and Lockyer. Having studied female endocrinology deeply, Novak is able to state the case for the various hormonal theories clearly and without those false and over-enthusiastic claims that stud all too thickly our gynaecological literature. If, apart from the above, one were to pick out the more succulent bits of this book, high place would be given to the chapters on Sterility and the Management of the Menopause. Perhaps the chapter on Backache is disappointing—but in what textbook of gynaecology is there a satisfactory description of this common condition that falls between the stools of orthopedics, urology and gynaecology?

Despite the outstanding quality of this book one would like to make two further criticisms of it: one that touches it in particular, and another which it shares with many other textbooks. First, its illustrations. It is freely illustrated and for the most part the illustrations have the same high quality as the text, but one

questions the value of several of them. For instance, Figs. 101, 111, 125, 126—to give only a few examples—are so unclear that I doubt they would convey any real information to a medical student. Then again, one questions in a textbook the value of such illustrations of such extreme rarities as the huge fibroma of the vulva, Fig. 128, and Ovarian Pregnancy, Associated with Hydatidiform Mole, Fig. 411. Is not the place for such rarities in a reference rather than a textbook? The elimination of these and a considerable number of other such illustrations would not hurt the book, and would make it less bulky and therefore easier for the reader to handle.

The second criticism has to do, as stated above, not only with this but with so many other so-called textbooks. They start, in the first edition, as books of modest size, and truly are students' textbooks in that a student can not only fairly quickly read them from cover to cover, but finds in them mainly the information essential to a reasonable knowledge of the subject. But with each fresh edition more and more material is added until they become a sort of hybrid—part textbook, part book of reference. The result is they can no longer be quickly read from cover to cover by the student who finds them not only too long but too erudite for his purpose, and so becomes discouraged and frustrated. We certainly have need of a first-class, comprehensive reference book or system of gynaecology written by one man rather than by a group of men. Novak's profound knowledge of the subject, and sane outlook on it, qualify him outstandingly to write such a book. But one wonders whether the best ends are served by him and so many others in trying to make textbooks serve both purposes, however excellent the hybrid product—as in this case—turns out to be. However, the policy governing the writing of textbooks being what it is, this is one of the outstandingly good examples of such a policy, and well worth a place in the library of every doctor who has to handle any quantity of gynaecology in his practice.

Hæmostatic Agents. Walter H. Seegers, Professor of Physiology, Wayne University College of Medicine, Detroit, Mich., and Elwood A. Sharp, Lecturer, Department of Medicine, Wayne University College of Medicine. 131 pp., illust. \$6.00. Charles C. Thomas, Springfield, Ill.; The Ryerson Press, Toronto, 1948.

The authors of this book have reviewed and added to the knowledge of hæmostasis, commencing with a review of the proved fundamental properties of the clotting mechanism and proceeding to a more complete, analytical concept and application of the substances involved in this complicated process. Vitamins K and K₂ are discussed in their relationship to the production of prothrombin and dicoumarol; the prothrombin-thromboplastin reaction is carefully explained and elaborated by means of charts, as well as the interaction of the latter two substances. The topical use of thrombin preparations in surface wounds and their use and value in urologic surgery, gastro-enterology, rhinology and rhinoplasty, surface bleeding, bone bleeding and ophthalmology is discussed and the relative value of thrombin ascertained from results obtained in surgery in these fields. The methods of administration and dosage are stated for intramuscular, intraperitoneal and intravenous administration as well as the performance of intracutaneous tests for sensitivity to thrombin and precautions to be taken in its use. The fibrinogen factor has been isolated and commercially utilized. Its clinical application and technique for use in skin grafting, its inestimable value in nerve suture by fibrin fixation, as well as its use and value in cortical mastoidectomy, is thoroughly discussed. The structure, preparation and clinical application of oxidized cellulose is thoroughly explored. This book may be considered a very worthy stride in the direction of the solution of the complete mechanism of hæmostasis.

Vascular Diseases in Clinical Practice. I. S. Wright, Associate Professor of Clinical Medicine, Cornell University Medical College. 514 pp., illust. \$7.50. The Year Book Publishers, Inc., Chicago, 1948.

This is the third book to be published in the past three years on the subject of Peripheral Vascular Disease. It is a smaller volume than the other two and its purpose is to present this specialty more from the clinical than from the investigative aspect. Emphasis is laid on the important fact that many of the diseases described are only a peripheral manifestation of a generalized condition. In this instance, the chapters on arteriosclerosis obliterans and thrombo-angiitis obliterans are particularly well done. The book is illustrated with numerous representative case records and has a good bibliography. The photographs and charts are clear, but many of the x-ray reproductions could be much improved in quality. As with its predecessors, this text has been written by a medical specialist and, in consequence, it appears to the reviewer that undue space is given to questionable methods of medical management and insufficient space is allotted to the more definite and spectacular results of surgery. The book would have been improved in usefulness by a surgical collaboration describing the various types of sympathectomy, sympathetic nerve and peripheral nerve block and a discussion of the various types of amputation. This book is to be recommended for the student and graduate desirous of getting a concise knowledge of this specialty, and consequently it will be welcomed into the group of specialized textbooks.

Introduction to Colour. R. M. Evans, Colour Control Department Head, Eastman Kodak Co. 340 pp., illust. \$6.00. John Wiley & Sons, Inc., New York; Chapman & Hall, Ltd., London, 1948.

This work has been described as a detailed study of colour in its physical, psychophysical and psychological aspects. Colour is a phenomenon which affects everyone of us in countless ways and, to some extent, in almost everything that we do where vision is involved. Colour has been studied from the viewpoint of pure and applied physics, in physiology, in industry and, of course, in the arts. In this volume the author endeavours to combine these approaches and would seem to have done very well in a difficult undertaking. After dealing extensively with the physics of colour and with colour perception, the author considers paints and pigments, colour in photography, colour in art and includes a final chapter on design and abstraction. Realizing that his readers will, in all probability, be interested in this subject from varying angles, the author has made the entire text as simple as is consistent with the point being brought out and has included a large number of diagrams, black and white drawings, photographs and plates in full colour. As a result he has succeeded in presenting a wealth of far-advanced knowledge on colour in a simple and popular manner. A graduate in optics and photography from M.I.T., Mr. Evans has had wide experience in colour research, is chairman of the Inter-Society Colour Council, and is widely recognized as an authority on this subject.

Mechanism of Abdominal Pain. V. J. Kinsella, Hon. Surgeon, St. Vincent's Hospital, Sydney. 230 pp., illust. 32/6. Australasian Medical Publishing Co. Ltd., Sydney, 1948.

The main point which Dr. Kinsella attempts to make is that the intestinal wall has sensation though the sensory fibres are more widely scattered than they are in other parts of the body. Consequently, a greater stimulus is required to produce pain. He supports this view on both the neuro-histological and physiological basis. He discusses "referred pain" preferring to call this latter heterotopic. It may be either splanchnic or somatic in type depending on whether pain experienced is deep or superficial, and whether or not there is

tenderness. He believes that the cause of tenderness in visceral disease is due to compression of the nerve fibres and is produced in exactly the same manner as inflammations elsewhere produce pain. He discusses pain in the various viscera and offers the interesting theory that the pain of peptic ulcer occurs because of tissue tension due to pathological hyperæmia of the ulcer base combined with the physiological and the hyperæmia of digestion and postural contraction or retraction of the wall of the emptying stomach. He supports this theory with experimental evidence and compares it with the various other theories such as those of Hurst now generally accepted. This is an excellent book and should find a place in the library of every abdominal and neurosurgeon.

Major Endocrine Disorders. S. L. Simpson, Physician, Willesden General Hospital, with charge of Diabetic and Endocrine Clinics. 552 pp., 2nd ed. \$12.50. Oxford University Press, London, New York and Toronto; McAinsh & Co. Ltd., Toronto, 1948.

This volume is primarily a clinical textbook, in which the basic experimental physiology is curtailed to the introductory pages for each endocrine gland. It is a sound, concise well-written book, with a number of photographic illustrations and a good index. A limited number of important references are cited, especially to the classical European clinical papers, but also to many modern investigations in America and elsewhere. Differential diagnosis and treatment are well considered. The appendices include an illustrated index of skeletal development (bone age) by A. M. Rackow. The book should have a wide appeal to practitioners and senior students and would also be a useful clinical reference book for experimental research workers in the related fields.

Surgery of the Colon and Rectum. Sir Hugh Devine, formerly Senior Surgeon, St. Vincent's Hospital Clinical School, Melbourne; and John Devine, Honorary Surgeon to Out-Patients Alfred Hospital, Melbourne. 362 pp., illust. \$13.10. John Wright & Sons Ltd., Bristol; Macmillan Co. of Canada, Toronto, 1948.

In this volume are assembled the many contributions and innovations that the senior author has brought before the profession, and the book is made complete by several chapters of more orthodox material contributed by John Devine. In Sir Hugh's abrupt, arresting, and sometimes mildly provocative literary style one can read valuable observations on diagnosis, the doctrine of preliminary defunctioning colostomy, resection of the proximal colon with anastomosis with enterotome, subtotal colectomy for ulcerative colitis, and much more. The book is a record of a large personal contribution to the subject, and if one cannot always agree with what is written, one can always admire and be informed.

Treatment of Some Chronic and "Incurable" Diseases.

A. T. Todd, Honorary Physician, Bristol Royal Infirmary. 324 pp., 2nd ed. \$6.25. John Wright & Sons Ltd., Bristol; Macmillan Co. of Canada, Toronto, 1947.

The greatest good that this book can do is to draw the attention of the reader to the inadequacy of modern methods of treatment in many diseases. The author has been unwilling to accept present day methods of treatment in these conditions. He has developed his own treatment in some cases following a certain amount of research. While the author is undoubtedly very sincere and his claims for better than average results ring true, the whole book leaves the impression of not being very fundamental.

Intracranial Tumours. P. Bailey, Professor of Neurology and Neurological Surgery, University of Illinois. 496 pp., illust., 2nd ed. \$13.25. Charles C. Thomas, Springfield, Ill.; The Ryerson Press, Toronto, 1948.

The first edition of this book appeared in 1933 and it is already a classic. This edition is much the same as the first with recent advances in the knowledge of brain tumours having been inserted. An atlas of roentgen photographs has been added. The style of the book is clear and simple, and obviously written by one who has a great knowledge of the subject. The author shows a great understanding of the difficulties encountered in the early diagnosis of brain tumours, and provides the clues that would lead one to suspect such a condition as well as the methods of proving or disproving its presence. It is also an excellent reference book for neurologists and neurosurgeons who must be constantly wrestling with the problem of the brain tumour.

Practice of Allergy. W. T. Vaughan, M.D.; revised by J. H. Black, M.D. 1132 pp., illust., 2nd ed. \$16.50. The C. V. Mosby Co., St. Louis; McAinsh & Co. Ltd., Toronto, 1948.

This book was perhaps the first comprehensive monograph on the rapidly developing yet relatively new subject of clinical allergy. Vaughan tried, remarkably successfully, to bring the vast amount of published material together so that the practising allergist could readily use the necessary information accumulated from the fields of botany, mycology, bacteriology and dietetics as well as from dermatology, gastro-enterology, paediatrics and otolaryngology. He combined his almost encyclopædic knowledge of the pertinent literature with a wide clinical experience and judgment. The wide acceptance of his book was well merited. Much progress had been made in the practice of allergy since 1939 and a second edition was due when Vaughan died. The second edition is a worthy successor to the first. It is a veritable mine of valuable information profusely illustrated and with adequate references to the more important literature. The section on allergic diseases is limited to those aspects touching on allergic practice and recent advancements and does not attempt the full analysis of these diseases found in standard works. In effect this section complements the more general texts. The most disappointing feature of this revision is the very inadequate space and consideration given to the anti-histamine drugs. However, it is perhaps too early for the wealth of information accumulating on these drugs to be crystallized into a form suitable for an authoritative work of this kind. This book is strongly recommended to all those seriously interested in the study and practice of allergy.

Pharmacology. J. H. Gaddum, Professor of Pharmacology in the University of Edinburgh. 504 pp., illust., 3rd ed. \$7.50. Oxford University Press, London, New York and Toronto; McAinsh & Co. Ltd., Toronto, 1948.

This handy student's text on Pharmacology will be received with pleasure in its revised form. By no means an extensive treatise, it seeks primarily to present general principles upon which to base a more detailed study. Dr. Gaddum's little book is brief, to the point and useful for course work in the subject. The new edition has been brought thoroughly up to date in this rapidly expanding field.

Methods in Medical Research. Vol. 1. Van R. Potter, Editor-in-Chief. 372 pp., illust. \$8.00. The Year Book Publishers, Inc., Chicago, 1948.

This is the first volume of a new series concerning methods in medical research. It should be understood that it is a technical laboratory book designed for convenient reference. As such, the publishers and editorial

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board are to be highly commended for undertaking this necessary but probably not very profitable work. It is common laboratory experience that a major difficulty in undertaking new procedures is the task of digging out the most suitable method. Often, the small tricks are not mentioned in methodological articles, so that one has to resort to contact with the originator of the technique, and where this is impossible perhaps waste valuable time in trial and error. This book reduces the initial search for the suitable method to a minimum, for not only are the applicable methods carefully described but key references to original articles are given, and many of the small tricks are discussed.

Volume one of the series deals with the assay of antibiotics, blood flow measurement, selected methods in gastro-enterologic research and cellular respiration, four of the major fields of research at present. It is perhaps unfortunate that the series was not planned in loose leaf form so that it could be kept up to date. It is, however, to be expected that the publishers will lend their efforts towards progressive revision of the text in pace with the rapid advances in the methods of medical research.

Acute Intestinal Obstruction. R. Smith, Assistant Surgeon, St. George's Hospital, London. 259 pp., illust. \$4.50. Edward Arnold & Co., London; Macmillan Co. of Canada Ltd., Toronto, 1948.

This monograph is a clear and concise review of the present day knowledge of acute intestinal obstruction. It is written as a textbook and, although not so stated in the preface, it would appear as if the general surgeon and the Fellowship student were particularly in the mind of the author. Intestinal obstruction is divided into the customary varieties of high small bowel, low small bowel and large gut and each is discussed in respect to pathology, diagnosis, types and treatment. In the section on conservative management of simple small gut occlusions, the author recommends this method of therapy but is cautious and not too specific in differentiating the simple obstructions from the strangulation types. Indeed it is difficult to do so, and it would seem preferable if he emphasized the limiting of this conservative method to low small gut obstruction in a postoperative patient, both immediate or late, as this is the group where adhesive obstruction is most common. The case of low small gut obstruction where no previous abdominal operation has been done should, in the reviewer's opinion, be operated upon as soon as the patient can be suitably prepared. The chapters on preoperative, operative and postoperative treatment are adequately done and each of the pathological causes that produce intestinal obstruction is briefly covered. This small book, though contributing nothing new, is timely and will gain a place amongst medical textbooks because of its clarity and conciseness.

Hospital Trends and Developments 1940-1946. Edited by A. C. Bachmeyer, M.D. and Gerhard Hartman, Ph.D. 819 pp. \$5.50. The Commonwealth Fund, New York, 1948.

The generous reception accorded the previous work of these two editors, "The Hospital in Modern Society" is in itself the best recommendation for this second volume. Each book is a collection of outstanding contributions to the field of hospital literature. While the articles are of primary interest to those actively engaged in the direction and administration of hospitals, or in training for such duties, they merit the attention of the clinician also. There is a distinct need today for the practising physician to have a better understanding of the problems of hospital administration, just as there is need for the trustee, the administrator and his assistants to have a greater appreciation of the day to day activities and responsibilities of the practitioner. An excellent opportunity for the promotion of such increased mutual

understanding is offered by the editors in their latest effort. Their eminence in the field of hospital administration assures the reader that he may read this volume, and its predecessor, in all confidence that the material has been chosen wisely and well.

Outline of Physiology. W. R. Amberson, Professor of Physiology, University of Maryland; and D. C. Smith, Associate Professor of Physiology, University of Maryland. 502 pp., illust., 2nd ed. The Williams & Wilkins Co., Baltimore; The University of Toronto Press, Toronto, 1948.

In the opinion of this reviewer, this is a beautiful little book which is particularly improved in its 2nd edition. It does not meet the needs of medical students either in its scope or plan, since much of the book is concerned with concepts and fundamentals which should be familiar by the time the student enters upon the first year of his medical course. In addition, most medical schools require considerably more knowledge of physiology than is here presented. It should be borne in mind, however, that this book was written as a first year course in physiology on the pre-medical, or general science, level, and for this it does an excellent job. Nothing is taken for granted and basic concepts are presented clearly. The numerous illustrations are extremely helpful and speak for themselves. The material is thoroughly up to date and the book is well worth recommending for that purpose for which it is meant.

BOOKS RECEIVED

Etiological Principles of Pyæmia in Ancient Egyptian Medicine. R. O. Steuer. 36 pp., illust. \$1.50. The Johns Hopkins Press, Baltimore, 1948.

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